THE

AMERICAN REVIEW OF TUBERCULOSIS
ABSTRACTS OF TUBERCULOSIS

VOLUME XX NOVEMBER, 1929 ABST. No. 4

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Aetiology of Acquired Bronchiectasis.—This study deals with the aetiology of acquired bronchiectasis in adults. Ten case histories are cited. In seven the causative factor was a gangrenous and foetid pneumonopathy which preceded the discovery of the bronchial dilatation by various lengths of time, from months to years. In the other three the primary cause was a nonfoetid lung suppuration. These pathological conditions bring about simultaneously lesions of the pulmonary parenchyma and destruction of the adjacent bronchi. The diseased areas are surrounded by a dense sclerosis, which differs from the ordinary scar-tissue indicating healing or healed lesions. Within this sclerotic tissue infection lies dormant or smouldering. At the time of discovery of the bronchiectasis months or years may have elapsed since the acute condition in the lung. During the interval there may have been complete freedom from symptoms, but more commonly there are intermittent exacerbations of respiratory symptoms, chiefly cough and expectoration, which may or may not be foetid. In the determination of these bronchiectases the two most essential factors are the cicatricial sclerosis and the destructive lesions of the bronchi. For this bronchial dilatation connected with pulmonary suppuration, gangrenous or not, the American term of *bronchiectatic abscess* seems a very good one.—*Sur l'étiologie de certains cas de dilatation bronchique de l'adulte, M. Léon-Kindberg and R. Kourilsky, Ann. d. Méd., November, 1927, xxii, 389.*—(*B. T. McM.*)

Acute Congestive Pulmonary Oedema.—Acute congestive pulmonary oedema is not usually recognized as an entity. In text-books it is not differentiated from acute idiopathic pulmonary congestion, and not infrequently it is confused with corticopleuritis. It has a typical clinical symptomatology, a rather characteristic X-ray appearance, and, most important, it can be differentiated by chemical and cytological examinations. The sputum, when present, is frequently diagnostic. It does not contain tubercle bacilli, and in its cell- and

albumen-content is characteristic of oedematous fluids. If the affected part of the lung is aspirated, as was done in one of the three cases described, a characteristic oedematous fluid is found.—*Congestions aigues du poumon et oedème congestif, G. Caussade and A. Tardieu, Ann. d. Méd., May, 1928. xxiii, 413.*—(*B. T. McM.*)

Diaphragmatic Hernia.—Once thought of as a rare condition revealed only at autopsy, diaphragmatic hernia has come to be a not uncommonly detected disease, especially since roentgenological examination has been brought into frequent use. The symptoms are usually indeterminate, and detection of the condition increases in proportion with the coöperation between clinician and radiologist. Diaphragmatic hernia may roentgenologically simulate pneumothorax, hydrothorax, bronchiectasis, abscess of the lung, eventration of the diaphragm, or diverticulum of the oesophagus. It may also be intermittently recurrent. It may contain only solid viscera, which increases greatly the difficulties of diagnosis. It is most commonly congenital but may be acquired. Cases have been described in which the stomach, spleen, omentum, pancreas, kidney, colon and part of the small gut were contained within the thorax. The abdominal organs most frequently found in the chest are, "in the order of their frequency, the stomach, colon, omentum, small intestine, and spleen." The condition may be brought about through "congenital enlargement of normal openings in the diaphragm, trauma, short oesophagus, or final rupture of an eventrated diaphragm." Congenital cases occur more commonly on the left side. Symptoms referable to the chest are usually, "distress, gurgling, precordial pain, and dyspnoea." In numerous patients there are also a set of symptoms related to the gastrointestinal tract, such as "pain, distress, burning or fulness in the upper portion of the abdomen, nausea and vomiting after meals with relief from distress, flatus and eructation, pyrosis, mild dyspepsia, and weak stomach." Other suggestive symptoms are constipation with cramps, mild nonproductive cough, and difficulty in swallowing food. Haematemesis may occur. On physical examination tympany or dulness, gurgling, diminished breath-sounds, limitation of expansion, absence of Litten's sign (these signs occur most commonly on the left side), and inability to distinctly outline the heart, are the usual findings. Surgical interference is the only treatment which helps at all. The mortality rate from operation is 30 to 35 per cent, but the likelihood of fatal complications is great enough to justify operation.—*Diaphragmatic Hernia. Report of Three Cases, J. N. Sisk, Am. J. Surg., January, 1928, n.s. iv, 67.*—(*H. S. W.*)

Rupture of Diaphragm in Infants.—A male child, aged one year and seven months, was diagnosed as having von Jaksch's anaemia. The day before death it developed intractable vomiting. Postmortem examination confirmed the diagnosis. In addition, the whole stomach was found in the thorax, rupture of the diaphragm having occurred in the vicinity of the oesophageal opening. Apparently the gradually increasing tension in the abdomen had led to the rupture of a congenitally weak area.—*Rupture of Diaphragm in a Case of von Jaksch's Anaemia, S. N. Dow, Brit. M. J., October 27, 1928, no. 3538, 748.*—(*W. I. W.*)

Nontuberculous Spontaneous Pneumothorax.—A review of the literature from 1844 to the present allows a tabulation of 84 cases of spontaneous pneumothorax of nontuberculous aetiology. The aetiology and pathogenesis of spontaneous pneumothorax, with particular reference to the accompanying compilation, were considered. Tuberculosis is probably the most frequent single cause. Pneumonia follows, with a 35.7 per cent incidence in this tabulation; then emphysema and gangrene. Expressed pathogenetically, pneumothorax may be caused by (1) degeneration in the lung (abscess, gangrene, bronchiectasis, infarction, empyema), or (2) rupture of the lung due to congenital defect, emphysema, or foreign body. Pneumothorax, either open, closed, or of the check-valve variety, may be seen as partial or total, unilocular or multilocular, simple or complicated, and unilateral or bilateral. Three cases of nontuberculous spontaneous pneumothorax are added to the literature: all were postpneumonic, and simple (uncomplicated), and made uneventful recoveries. Their recognition was made roentgenographically. They were characterized by scanty clinical manifestations and signs, which probably would not have sufficed for diagnosis in the absence of roentgenograph and fluoroscopy.—*Spontaneous Nontuberculous Pneumothorax in Infancy and Childhood, E. G. Stoloff, Am. J. M. Sc., November, 1928, clxxvi, 657.*—(*W. I. W.*)

"Rheumatic Lung."—The term *rheumatic pneumonia* is an old one, and was more in vogue in the medical literature of a past generation. Possibly this is because the acute rheumatic fever of adults is now less common than formerly. However, the

condition about to be described is so different clinically from pneumonia that the simpler term *rheumatic lung* is preferred. Post-mortem material was obtained from 6 patients who displayed this peculiar consolidation of the lung. Not all were children, their ages being, respectively, seven, eight, nine, thirteen, twenty-six and thirty-three; but all gave evidence of acute rheumatic infection, usually of the heart. The extent of the pulmonary consolidation was a remarkable feature. Microscopically, its most striking characteristic was an enormous endothelial proliferation, the cells apparently originating from the walls of the alveolar capillaries. There was also a considerable effusion of red blood cells from the damaged capillaries. The reactive process seems to be identical with that described by Coombs as pathognomonic of rheumatic infection elsewhere. Clinically, the consolidation may spread through the lungs with great rapidity. There is very little disturbance of the respiratory rate and scarcely any respiratory distress until the consolidation is enormous. If salicylate of soda is given the temperature is raised little, or not at all. This type of consolidation probably accounts for the patches of dulness met with at the left base in association with rheumatic carditis, and hitherto attributed to collapse from pressure. Although this condition appears only in those severely affected by rheumatism, it does not usually seem to add much to the gravity of the prognosis, and the great majority live long enough for the dulness to clear up. The cases reported in this paper showed a much more rapid extension of the dulness than is seen in the average case, and the symptoms were naturally more acute, but even in these it was remarkable how little the temperature and respirations were affected by the onset of the lung consolidation.—*The Rheumatic Lung, A. E. Naish, Lancet, July 7, 1928, ccxv, 10.—(J. S. W.)*

Benign Tumors of Bronchus.—An analysis of the literature reveals a fairly large variety of benign pulmonary neoplasms. The number of neoplasms which will be removed in the future is expected to show an increase, for the increasing recognition of the value of bronchoscopy and its more frequent application justify this prediction. A case is cited in which a patient with pulmonary symptoms was treated for tuberculosis, asthma, chronic pulmonary fibrosis and myocarditis, while the basis for his trouble was the presence of a fibrolipoma in his left main bronchus. This case demonstrates the importance of including bronchoscopy in the study of pulmonary conditions with obscure or atypical symptoms. It also demonstrates that by timely bronchoscopy we can hope to save the lives of patients who have benign neoplasms of the bronchus.—*Benign Neoplasms of the Bronchus, M. C. Myerson, Am. J. M. Sc., November, 1928, clxxvi, 720.—(W. I. W.)*

Fibrocystic Disease of Lung.—This is a case report with autopsy findings of fibrocystic disease of the lung. The condition appears to be analogous to fibrocystic disease of the breast, and to be due to toxic action (rather than direct infection of the lung), producing gradually increasing fibrosis, loss of elastic tissue, "occlusion-cyst" formation with irregular epithelial hyperplasia and metaplasia, and eventual loss of function.—*A Case of Fibrocystic Disease of the Lung, P. J. Kerley, L. R. Shore and W. A. Young, Lancet, October 1, 1927, ccxiii, 699.—(B. T. McM.)*

Fibrosarcoma of Pleura.—Malignant tumors of fibroblastic origin arising in the pleura are very rare, barely more than 10 cases having been reported. A male, seventy-one years of age, was received in the Boston City Hospital suffering from dyspnoea and pain in the right side. During the preceding six months he had lost 30 pounds. His present symptoms began only three weeks before admission. Physical examination revealed a chest with limited expansion, dulness to flatness, except at the apex, and diminished fremitus on the right side. Breath-sounds were exaggerated on the left and distant on the right side. The heart was displaced to the left. On the day of admission 1140 cc. of thin blood-stained fluid were aspirated from the right pleural cavity. Two days later, 300 cc. of a thicker bloody fluid were aspirated from this side. Cultures and guinea-pig inoculations of these fluids were negative. The patient died three days after admission. Autopsy showed a normal left lung and pleura. On the right the parietal pleura was unevenly thickened, and formed a large sac which was distended with 2200 cc. of thin blood-stained fluid. The lung was collapsed, and formed a small and very firm mass projecting from the medial wall of the pleural cavity. The parietal and visceral pleurae were adherent posteriorly and toward the mediastinum. The inner surface of the parietal pleura was mottled yellowish-brown and red, and presented a cobblestone appearance, roughened by adhering flecks of fibrin. The fresh surface, which varied from 3 mm. to 4 cm. in thickness, was firm, friable, glistening and gray. It stripped easily from the ribs and intercostal spaces, leaving a relatively

smooth surface. The mediastinal lymph nodes were normal in size. A single node containing a minute, hard, white glistening body, 2 mm. in diameter, lay adjacent to the thickened right pleura. The entire right parietal pleura was infiltrated by tumor tissue, which, microscopically, was composed of round and spindle-shaped cells and a variable amount of intercellular material. The morphology of the cells, their arrangement, their invasive character, and their rapidity of growth suggested fibrosarcoma. The structure of the visceral pleura varied in different places, and generally was quite unlike the parietal layer. Over the greater part of the surface of the lung it appeared as a relatively thin and uneven layer of poorly preserved collagen, with a few degenerating fibroblasts and endothelial leucocytes. In a few places there was actively growing tumor tissue which had invaded the pulmonary parenchyma. As the tumor was traced into the lung it gradually lost its cellular structure and became more and more collagenous. The entire lung showed a varying degree of atelectasis, which was greatest at the periphery beneath the thickened pleura. The parenchyma of the posterior and inferior portions of the lower lobe was deeply invaded by actively growing tumor tissue. A small focus of tumor was situated in the periphery of a single lymph node, and was extending by finger-like processes into the central portion. The diaphragm was covered on the upper surface by a narrow layer of actively growing tumor tissue, and in a few places was definitely invaded. Histologically, the type of cell from which the tumor arose was the fibroblast, which occurred most commonly as a long well-differentiated spindle-shaped cell. The nucleus was elongated, the chromatin forming a very delicate network, and the nucleoli appeared as small round dots. Where the tumor was growing rapidly the cell was frequently nearly round or oval. Giant cells, containing a single large nucleus or many nuclei, were sparsely distributed in the more cellular portions of the tumor. Collagen fibrils, which formed the intercellular matrix, varied in different parts. Where the tumor was actively invasive there was very little intercellular material, whereas in other areas, where growth had practically ceased, there was a great deal of collagen, and the fibrils had fused together to form wide irregular bands. The grouping of the cells was inconstant. Sometimes the spindle-shaped cells lay in parallel rows, more commonly they were grouped in bands which coursed in any direction. The less mature cells showed no definite arrangement except when clustered about the vessels. Small degenerating or necrotic areas were dispersed throughout the tumor. Clinically, it seems remarkable that a tumor could extend throughout the entire pleura, produce such an effusion, and lead to such a degree of atelectasis without producing more discomfort. Fibrosarcoma of the pleura is very rare, and one forming a complete sac of the pleural cavity is indeed a curiosity. In general, the tumor described may be classed as a slowly growing fibrosarcoma showing little tendency either to invade or to produce metastases. Descriptive plates accompany the article.—*Fibrosarcoma of the Pleura, Report of a Case, H. E. MacMahon and G. K. Mallory, Am. J. Path., July, 1928, iv, 387.—(J. S. W.)*

X-Ray Diagnosis of Cancer of Lung.—The diagnosis of pulmonary tumors is very difficult, especially in the earlier stages, but the X-ray has aided a great deal in the detection of such growths. This has led to a renewed interest in the manifestations of the disease, with the result that many cases have been reported, and the impression has got abroad that the incidence of tumor of the lung is increasing. Malignant tumors of the lung may be nodular, infiltrating or miliary. They may lie in the pleura, parenchyma or hilum. In size they may range from that of a pin's head to a mass occupying the entire lung. The largest single circumscribed masses are sarcomata. They may grow eccentrically about the bronchial wall without affecting the lumen, or they may invade the lumen, diminishing and eventually completely blocking it. In the event of partial stenosis of the bronchus there develops a dilatation of the distal portion, with fibrosis, infection, bronchiectasis, and sometimes effusions. If stenosis is complete, atelectasis of the part occurs. The most common form is represented in the X-ray film as an irregular mass in or near the hilum, and extending usually into an upper lobe. Mediastinal tumors present asymmetrical shadows that are not homogeneous. The point of contact with the bronchus may be determined. There may be small islands of tumor-infiltration roundabout, or it may be associated with a dense shadow in a portion of the pulmonary field cast by bronchiectasis, atelectasis, etc. Parenchymal tumors usually appear as discrete, sharply outlined oval masses. When single they are considered to be primary, although a metastatic sarcoma may duplicate the picture of a primary carcinoma. When pleural, tumors resemble fluid, or there is a shadow over one entire pulmonary field. In diagnosing bronchial stenosis the use of lipiodol is helpful, as

is also evidence of atelectasis. There is frequently degeneration, necrosis and excavation in large carcinomatous masses, but not in sarcomata or the infection that may accompany these. Retraction or the shrinkage of atelectasis may greatly change and complicate the X-ray picture. At the different stages tumors may resemble various diseases. In the hilum the early stages must be differentiated from adenopathy (Hodgkin's disease, tuberculosis) or infarction; the florid stages may be diagnosed consolidation, interlobar effusion, interstitial inflammation, tuberculosis, or syphilis; in the late stages they may resemble fibrosis or effusion. Alveolar tumors in the early stages are sometimes diagnosed as tuberculosis, in the florid stages pulmonary Hodgkin's disease or syphilis, in the terminal stages cysts or benign tumors. Miliary carcinomatosis must be differentiated from pneumonoconiosis and miliary tuberculosis, and pleural carcinoma from fibrosis and effusion. The clinical history is of the greatest importance, as are also serial X-ray pictures. There are cases, especially in metastasis to the lung, in which the symptoms of fever, pain, weakness, dyspnoea, etc., may suggest a mild respiratory infection. The physical examination in pulmonary neoplasm is of no value whatever, and dependence must be placed entirely on the history and roentgenological film. The disease is usually easily differentiated from tuberculosis. Neoplasm much more commonly involves the hilum, or the parenchyma and hilum. Large carcinomata produce more rapid fibrosis and retraction, with shifting of mediastinal organs, than does tuberculosis. Both diseases may give rise to cavity: in tuberculosis this tends to be multiple and of irregular outline, with a thin, well-defined wall, while in tumor the cavity appears as a central point that transmits light in a large area of dense shadow. In Hodgkin's disease the shadow involves the entire mediastinum rather than constituting a single globular enlargement, as carcinoma, for instance, would appear. Therapeutic exposure to X-ray will also aid in the diagnosis of this disease. Syphilis and intrathoracic thyroid must be distinguished from malignant tumor, as must occasionally also cysts and teratomata. Enlargement or distortion of the hilum shadow and circumscribed areas of intrapulmonary shadow in persons of cancer age should immediately excite the suspicion of cancer.—*The Roentgen Diagnosis of Malignant Neoplasms, I. S. Hirsch, Radiology, December, 1927, ix, 470.*—(*H. S. W.*)

Bronchoscopic Diagnosis of Primary Cancer of Lung.—A report is made on 29 cases of primary carcinoma of the lungs, the diagnosis being made by biopsy. Cough was the most common symptom, and bloody sputum was present in 18 cases. Dyspnoea was noted in about half, and in some cases it was entirely out of proportion to the amount of lung involved. Pain in the chest, fever and hoarseness were less common symptoms. The most constant physical sign was partial or complete stenosis of the bronchus, involved in 19 cases. Pleural effusion occurred three times, and paralysis of the vocal cords twice. In early primary carcinoma of the bronchus, the roentgenograph shows a typical unilateral hilar density, with infiltrating borders definitely centered at the hilum, and an atelectatic or occasionally a bronchiectatic appearance due to bronchostenosis. The presence of one or both of these phenomena should warrant a bronchoscopic examination. Atelectasis is common, and in many cases constitutes the only clue to malignant tumor. If the pleura is involved, fluid accumulates rapidly, and is usually bloody. Tumors of the tracheobronchial tree are highly malignant, 16 in this group being cases of squamous cell epithelioma, 10 adenocarcinoma, 2 carcinoma, and 1 lymphosarcoma. As to differentiation from metastatic lesions, in the latter stenosis of the bronchus is rare and ulceration into its lumen seldom occurs. Accurate clinical diagnoses were made in less than half the cases, as the secondary suppuration following partial occlusion of the bronchus led to a diagnosis of abscess or bronchiectasis. The end-results of treatment are disappointing. Location of the growth usually makes surgical removal difficult. Deep roentgen-ray exposures are probably the most helpful of remedies. Of the above group, 19 are dead, and 3 are improving under deep roentgen-ray therapy. Bronchoscopy is the safest and most exact method of making an early diagnosis.—*Value of Bronchoscopy in Diagnosis of Malignant Conditions of the Lungs, P. P. Vinson, H. J. Moersch and B. R. Kirklin, J. Am. M. Ass., November 10 1928, xci, 1439.*—(*G. L. L.*)

Cancerous Cavities of Lung.—Two cases of primary cancer of the lung with autopsy findings are reported. In both cases cavities were present in the affected lung adjacent to but outside the tumor. The formation of cavity and the mechanism of suppurative processes in cancer of the lung are discussed. The cavity may form within the tumor mass, due to the degeneration and necrosis of the cancer cells and their subsequent excavation through a bronchus. In the second type the cavity is formed outside the tumor, and is due to a progressive

atrophy resulting from the cancerous infiltration which obliterates and compresses the blood-vessels and bronchi so that the lobules supplied by these structures become gangrenous. Later there may be secondary infection and suppuration. Both types may be present simultaneously.—*Formes Nécrosantes, cavitaires, et suppurées du cancer primitif du poumon, Olmer, Rouslacroix and Poinso, Ann. d. Méd., March, 1928, xxiii, 13.*—(*B. T. McM.*)

Combined Pulmonary Tuberculosis and Cancer.—An interesting case is reported, with the citation of two cases from the literature, in which there was a small bronchial carcinoma in a man 78 years of age, with absence of tubercle bacilli from the sputum and a roentgen diagnosis of fibroulcerative pulmonary tuberculosis.—*Beitrag zur Kombination von Lungentuberkulose und Lungentumor, W. Landau, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 266.*—(*H. J. C.*)

Bronchomycosis.—Primary fungus infection of the lung is more common than the literature indicates. The diagnosis has not usually been made until postmortem observations have revealed the true nature of the infection, the presence of a yeast-like fungus in sputum being usually considered a mouth or outside contaminant of no clinical significance. The authors have isolated yeast-like or other fungi from the sputum of 18 patients in whom the primary infection was in the lung, without involvement of other structures at the beginning of the disease. Yeast-like fungi were isolated from the sputum in 40 other cases in which there was a definite clinical condition, such as tuberculosis or carcinoma, and in these cases it is possible that the fungus was a secondary invader in tissue of lowered resistance. The repeated finding of a fungus in sputum from a patient suffering from either a mild or a severe inflammatory process in the lung is indicative of a fungus infection of the organ, and while this finding is not, of itself, sufficient evidence to make a diagnosis of primary infection, the absence of any other definite aetiological evidence gives strong support to such a diagnosis. In twelve of the cases studied the microörganisms isolated produced lesions in laboratory animals. For clinical purposes, these microörganisms are conveniently classified into (1) yeast-like, cryptococci, *oidium, monilia, saccharomyces* and *endomyces*, and (2) filamentous or bacillary forms, such as the actinomyces group. The severe type of infection is much like tuberculosis and is probably often mistaken for it. The characteristic thing about most of these infections is the disproportion between the symptoms and the amount of pathological change. The cough is usually only moderately severe, without a large amount of expectoration, the fever is of a low type, if any, and the leucocytes range from normal to seldom more than 10,000. The frequent histories of influenzal infection or pneumonia several years before suggest the importance of lowered tissue-resistance.—*Bronchomycosis: Report of Eighteen Cases of Primary Infection in the Lung, W. D. Stovall and H. P. Greeley, J. Am. M. Ass. November 3, 1928, xci, 1346.*—(*G. L. L.*)

Bronchomoniliasis.—In a white American, who had been living in Porto Rico for twelve years, the symptoms were those of chronic pulmonary tuberculosis, but repeated examinations of the sputum over a period of ten years, by direct microscopic and antiformin methods as well as by animal inoculation, failed to show tubercle bacilli. Postmortem examination revealed congestion of the lungs and large white kidneys. Moniliae were isolated from these organs. The lungs showed widespread oedema, and small poorly defined foci, with necrosis and polynuclear infiltration in the centre and surrounded by a zone in which there was mononuclear infiltration and epithelial and connective-tissue proliferation.—*Bronchomoniliasis, W. R. Galbreath and C. Weiss, Arch. Int. Med., October, 1928, xlii, 500.*—(*W. I. W.*)

Bronchial Spirochaetosis.—In 1906 Castellani described a bloody bronchitis endemic in Ceylon, in which there were polymorphous spirochaetes in the expectorated pus, and named the disease *bronchial spirochaetosis*. These findings were confirmed by many workers, especially by those working among the Filipinos and British Hindus. Moreover, they found the spirochaete different from the type described by Vincent. The question which then arose and which is still a very moot one was whether there were many spirochaetes or a definite form which produced this type of bronchitis. In 1925 Bezançon and Etchegoin reported their findings in 239 samples of sputum. In 140 nonhaemorrhagic sputa, in 69 blood-streaked sputa, in 2 bloody sputa, in a case of dilated bronchi, and in one case with bloody sputum in which there was also a pneumothorax present, no spirochaetes were discovered. In 27 bloody sputa of tuberculous patients, spirochaetes were found twenty-six times. Their technique was to wash the sputum two or three times with distilled water, and then stain the smear with Loeffler's or Pulger's stain, or examine

it directly with an ultramicroscope. The spirochaetes were 7–15 μ long each and spiral about 3 μ. They were differentiated from the buccal spirochaetes by their greater length, from the *Spirochaete dentium* by the fact that these microörganisms have two refractile streaks running through them, whereas the bronchial type has the whole body refractile. Bezançon found the spirochaete of Castellani in 7 out of 11 cases of pulmonary gangrene. It was associated with the fusiform bacillus. It was usually in the central part of the gangrene, and never at the periphery of the lesion. The authors grew the bacteria in horse-serum diluted 1 to 5, at 29°C. The spirochaete found in the tuberculous cases grew badly in this, but very well if the serum was peptonized. Vincent's form did not grow in this medium. Many authors disputed these findings, among them especially Vincent and Delamare. These authors believe that they are the same species, only polymorphic in character, and are true Vincent's spirochaetes. In the 32 cases which the authors gathered in the last two years, the following main facts are cited. *1:* The sputum is mucosalivary, with red particles in it like disintegrated blood. It has a granular consistence. At times it is mucopurulent, or of haemorrhagic purulent character. However, it always has the characteristic granules in it. *2:* It contains cellular detritus, both bronchial epithelium and alveolar cells. The bacilli are the same as in any expectoration. The fusiform bacillus is the most constant germ, but is often in very small quantity. *3:* The spirochaetes are found in the brick-red granules. They are polymorphic, sometimes separate and sometimes matted together. They stain easily, especially with phenol-gentian-violet. The Fontana stain is most satisfactory in bringing out the distorted forms. They grow well in diluted horse-serum covered with a layer of oil, and especially well if peptone has been added. They have not been cultivated in pure culture, but mixed with saprophytes. Guinea pigs were inoculated, and severe and extensive oedema and gangrene were produced. Spirochaetes were found at the site of injection. It was possible to infect a series of animals, one from the pus of the previous one, and the virulence of the microörganisms increased until one guinea pig died in eight hours. In some of the animals the spirochaetes were found in the urine two days before death. The pus was never pure, but always secondary invaders were present. *4:* In eight of the cases there was also tuberculosis present. The tubercle bacillus was found in the mucopurulent part of the sputum; the spirochaetes in the brick-red granules. The presence of spirochaetes seemed to aggravate the disease very much. Clinically there are two types of disease. There were 12 cases of acute spirochaetal bronchitis, and 5 cases were chronic. In 7 cases the spirochaetes were accidentally found in the course of the sputum examination. The acute cases do well with doses of novarseno-benzol or stovarsol. Several courses must be given to get rid of the spirochaetes even after the symptoms have disappeared. In the chronic cases the results with these drugs were less favorable. In the cases complicated by tuberculosis the results were very poor. *Conclusions:* Spirochaetal bronchitis has been described since 1906. The sputum has brick-red granules in which the microörganism is found. The spirochaete will grow on diluted peptonized horse-serum. Novarsenol-benzol or stovarsol act favorably in the acute cases.—*Contribution a l'étude des spirochetoes bronchiques á propos de 32 cas, J. Gate and M. Billa, Presse Méd, April 23, 1927, xxxiii, 513.*—(*J. V. L.*)

Thoracic and Abdominal Streptothricosis.—Streptrothrix infection of the chest or abdomen is not common. A case which developed this disease in both these localities and which was successfully treated by an autogenous vaccine is described. A twenty-four-year-old woman, when first seen (December, 1925), was suffering from appendicitis, and the appendix was removed in a state of early gangrene. Ten days later febrile symptoms developed, with pain in the right lumbar region. A week later the right perinephric region was explored, but nothing abnormal was found. This was followed by steady improvement. Two months later, however, the temperature again became elevated and a condition of *B. colon* bacilluria was found, which was treated with a vaccine and gradually cleared up. In May, 1926, pain again was felt in the right lumbar region, accompanied by a hectic temperature. Examination showed marked diminution of movement of the right side of the chest and decided bulging of the lower ribs on that side. Aspiration of the chest yielded thick blood-stained pus. Resection of parts of the eighth and ninth ribs revealed a fairly large smooth-walled abscess in the nipple line. No communication through the diaphragm could be found, though the liver dulness was definitely greater than normal. The examination of the abscess contents showed the presence of streptothrix (actinomycosis). Two months after this, that is, in July, a new swelling developed in the epigastrium over the margin of the ribs, and a second large abscess was

opened, which was evidently between the liver and the diaphragm. A vaccine was prepared from the contents of this abscess, and injections were given every five days, starting with a 1 minim dose of a suspension consisting of 1 mgm. of culture per cubic centimetre of diluent. The abscess cavities were treated with a 5 per cent alcoholic solution of a mixture of brilliant-green and methyl-violet. The patient also received large doses of iodine which were later abandoned. No progress was made up to the middle of September, at which time the dose of vaccine was increased to 20 minims. Conditions shortly improved; the temperature reached normal for the first time in six months. The granulations had by this time completely disappeared, leaving a healthy sinus. Vaccine treatment at long intervals was administered for the following six months, and the patient was then in perfect health and able to resume her previous occupation. In discussing the part the vaccine played in this case it must be remembered that the patient had many lines of treatment going on at the same time, but there is evidence that the vaccine clinched the cure. Soon after the vaccine was started the granulations became vascular and large, which was interpreted as a sign of healing, for the granulations in streptothrix are not particularly vascular. Moreover, in the latter part of September, a swelling was developing in the region of the original operation wound. At this time the vaccine had been pushed up to over 1 mgm. of the streptothrix mass, and immediately after the dosage had been reached the temperature began to reach normal and the swelling to subside. Apparently large doses are easily tolerated.—*A Case of Thoracic and Abdominal Streptothrix which Terminated Successfully, together with a Note on Treatment with an Autogenous Vaccine, C. H. McIlraith, W. Turner and J. A. Braxton Hicks, Lancet, July 14, 1928, ccxv, 68.*—(*J. S. W.*)

Dangers of Ephedrine in Heart Failure.—Following an acute attack of breathlessness a patient was given 40 three-eighth grain capsules of ephedrine which he took over a period of twenty days. At the end of this period he came under observation complaining of palpitation, weakness, shortness of breath and cough. Physical examination revealed a dilated decompensated heart with effusion on the right side of the chest. *Conclusions:* Ephedrine is a dangerous drug to use when patients show evidence of cardiac damage. Extreme care is necessary in the diagnosis of bronchial asthma, as not infrequently cases of so called "cardiac asthma" are put in this group. Ephedrine may produce acute cardiac decompensation and pulsus alternans in patients with damaged hearts. If during the administration of ephedrine the patient exhibits any toxic symptoms such as palpitation, tachycardia, arrhythmia or vasomotor disturbances, the drug should be promptly discontinued. Pulsus alternans does not have the serious significance for patients who exhibit this condition with tachycardia that it has for persons with a normal cardiac rate. The sale of ephedrine to the layman should be discouraged, and even its indiscriminate use by the physician is to be deplored.—*Danger of the Administration of Ephedrine in Heart Failure, W. A. Bloedorn and P. F. Dickens, Arch. Int. Med., September, 1928, xlii, 322.*—(*W. I. W.*)

Development of Pulmonary Anthracosis.—There does not appear to be any justification for a conception of the intestinal origin of pulmonary anthracosis. The deposition of the pigment in early anthracosis is dependent upon the condition of the pulmonary tissues and is almost uniform. Local variations account for deviations, among these being pulmonary fibroses or pleural adhesions as well as fresh pneumonic processes. The frequency of fibrous changes in the upper pulmonary areas which are commonly seen in the thorax of adults accounts for the increased pigmentation in the upper pulmonary field.—*Die Entwicklung der Lungenanthrakose im Kindesalter, M. J. Madlener, Ztschr. f. Tuberk., 1928, xlix, 321.*—(*H. J. C.*)

Health Hazards in Chromium Plating.—During the past few years chromium plating has developed rapidly, and it is now being extensively employed in finishing automobile parts and plumbing fixtures, because of its high lustre and resistance to tarnish; and upon printing plates, gauges, tools, and dies on account of its extreme hardness. The bath used for chromium plating consists principally of chromic acid. During the plating process, considerable hydrogen and oxygen are liberated, and these carry a spray of chromic acid into the air. These facts prompted the U. S. Public Health Service to make a study of health hazards in chromium plating, in which it was assisted by the Bureau of Standards. It has long been known that, in the manufacture of chromic acid and chromates, the operators are subject to attack by an ulcerative process and perforation of the nasal septum; and to the formation of ulcers or "chrome holes"

upon the hands or other exposed parts of the body. Accordingly, some provisions have been made in all chromium plating plants for artificial ventilation and for other sanitary measures. In spite of these precautions, however, the employees in some plants have been affected in the above mentioned ways. In order, therefore, to determine the extent of the hazard and the best means of overcoming it, a survey was conducted in several commercial plants. This included a study of the methods and degree of ventilation, of the concentrations of chromic acid in the air breathed by the workers, and a physical examination of the workers themselves. Although only 6 plants were visited, and 23 persons examined, the results were so consistent in different plants, and agreed so well with previous experience with chromates, that certain tentative conclusions and recommendations are warranted. It was found that exposure to very low concentrations of chromic acid, for instance, 1 mgm. in 10 cubic metres of air, or one-sixtieth of a grain in 350 cu. ft. (which may be considered approximately the volume of air breathed by a worker in eight hours), is sufficient to cause nose-bleed and nasal inflammation in a week or less. Higher concentrations or longer exposures cause extensive attack and even complete perforation of the nasal septum. This is painless, however, and the operator may be entirely unaware of the perforation. Many of the employees were found to have chromium ulcers on the hands or other exposed parts of the body. No evidence was found of injury to the respiratory tract except in the nose, nor of any effect upon the digestive system or the kidneys. While, therefore, there is a real hazard in chromium plating, it is not critical, and can be entirely eliminated by suitable measures. These should include an effective system of ventilation in which the air is drawn horizontally across the plating tanks into a narrow duct in which the air velocity should be about 2000 feet per minute. So far as possible, rubber gloves, aprons, and shoes should be worn. Frequent applications of vaseline or mentholatum salve to the nose and hands greatly reduce the danger of ulceration. All cuts and abrasions of the skin should receive regular inspection and medical treatment. If these simple, entirely practicable measures are taken, the hazard can be practically eliminated. There is no reason, therefore, to fear any serious injuries from the extension of chromium plating that is likely to occur in the next few years.—*Health Hazards in Chromium Plating, Health News, U. S. Public Health Service, November 5, 1928.*

Pseudotuberculosis of Rodents in Man.—The authors pursued a series of studies with three strains of *Bacterium pseudotuberculosis rodentium*, isolated from disease foci in human beings. The microörganisms grew well on agar, to which guinea-pig organs, especially liver, had been added. Favorable growth was also obtained with the addition of human liver or liver extract. Virulence tests were performed on rabbits, guinea pigs and white mice, which revealed a variable action depending upon the culture medium on which they were grown. In immunization experiments with guinea pigs against infection with pseudotubercle bacilli only those animals remained alive that had been treated with lipoid plus bile, as well as those treated with the bacilli, the bacilli plus lipoid, the bacilli plus lipoid plus bile, bile alone, and bile plus lipoid, but not the animals treated with bacilli plus bile, lipoid alone, and the untreated animals. A series of mice treated with various lipoids or lipoid mixtures all died with the exception of those treated with blood lipoids.—*Studien über Pseudotuberkulosebacillen (B. pseudotuberculosis rodentium), die aus Krankheitsherden des Menschen gezüchtet wurden, A. Haim and Kemal, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 128.*—(*H. J. C.*)

Amoebiasis and Tuberculosis.—During the course of a year the author reviewed 200 cases of amoebiasis which were falsely diagnosed over a period of years as either cholecystitis or chronic appendicitis in the presence of predominant intestinal symptoms, or as nonspecific descending respiratory or bronchial catarrhs, in the presence of inflammatory diseases of the nose and throat which are frequent in cases of amoebic disease. The markedly toxic cases of amoebiasis of the intestines, leading to cachexia, are frequently considered as pulmonary tuberculosis. The atypical forms of amoebiasis are not so well known. In chronic cases the developing forms of the microörganism are not found in the stool but cysts should be sought for. The number of cyst cases, even in Germany, is larger than usually considered. Most of the cases were those that suffered infection in the field, or by contact, or at sea. In the foreground are the symptoms of the intestinal tract and frequently of the nervous system. In 30 cases there was a coincidence of pulmonary tuberculosis and amoebiasis of the gastrointestinal tract. Therapeutically *Yatren* and *Spirocid* proved valuable.—*Die Amoebiasis des Menschen im gemässigten Klima und ihre Beziehungen Zur Tuberkulose, A. Gehrcke, Beitr. z. Klin. d. Tuberk., 1928, lvxiii, 123.*—(*H. J. C.*)

Prognosis in Cavity Cases.—The prognosis in the case of cavity depends upon the type of disease process concerned. The early forms of tuberculosis are to be regarded as more favorable by far than the late tertiary forms, while the exudative progressive forms are absolutely unfavorable prognostically. As a result of a study of the statistics accumulated by the author it is concluded that clinical healing of cavities occurs in 15 per cent of the cases. These results can be markedly bettered by means of the better chances given in late years through carefully executed surgical procedures.—*Zur Kavernenprognose, K. Kötter, Ztschr. f. Tuberk., 1928, xlix, 350.*—(*H. J. C.*)

Tuberculosis Prevention since Laennec.—Thanks to Pasteur and the Pastorian methods that Villemin, and later Koch, built on, it is to be hoped that a monument will be eventually reared. Even before Sylvius had described the tubercle, numerous rules had been made for protection against phthisis. In some quarters the fear of a contagious element became almost an obsession, and the obligatory declaration of tuberculosis was in fact accepted in certain places, especially Italian cities, at an early epoch. On the other hand, the theory of hereditary predisposition developed under the influence of Bayle, Broussais, Andral, and Laennec himself. Even Hippocrates taught that "a phthisical is born of a phthisical," and Sylvius, Boerhaave and others followed him. Louis, in 1841, convinced of heredity, declared that the relatively old theory of the contagiousness of phthisis ought to be abandoned. Pidoux was still more imperative, and was in the front rank of those who violently attacked Villemin and refused his proofs of transmissibility. It was only Robert Koch's memorable publication in 1882 which settled the matter. In France the pioneers of antituberculosis work were Roux, Nocard, Grancher, Arloing, Landouzy, Léon Bourgeois, Armengaud. The first French sanatoria established were at Hauteville, near Lyon, and Bligny, near Paris; the latter under Guinard as director. Grancher's important contributions were toward recognition of the early signs of tuberculosis, and establishing facilities for isolation or placement of, first, suspected cases in children, and later the sound issue of tuberculous parents. Thus arose the *Oeuvre Grancher*. Attempts to realize an antituberculous immunity were meanwhile carried out by many workers, but the notion soon took root, developed by Trudeau, Behring and others, that an effective vaccination could only be had by using living microörganisms, possibly attenuated in virulence. On this problem the workers of the Pasteur Institute were engaged for many years. Tubercle bacilli were cultivated on all sorts of media, and finally a strain was obtained which seemed to fulfill the requirements; it had been recultured successively every 20 to 25 days for thirteen years on a medium alkalinized by ox-bile or sodium-taurocholate. Unfortunately, individuals free from any tuberculous infection are the exception in long-civilized countries. The employment of Pirquet's cutireaction since 1908 has shown that at the age of 5, in European cities, over 35 per cent of children are infected, and almost all by the age of 20. The buccal route was selected for administration of the vaccine by Weill-Hallé and Turpin. Investigation showed that children in a domiciliary tuberculous environment showed a 32.6 per cent mortality during the first year in the city of Paris, and 26 per cent for the rest of France. By December, 1926, the vaccine had been given to 17,615 children, of whom 632 were followed, and among the latter 9, or 1.4 per cent, died of affections attributable to tuberculosis. Further observation is doubtless necessary to properly estimate the results.—*La prévention de la tuberculose depuis Laennec, Calmette, Rev. Belge d. l. Tuberc., September–October, 1927, xviii, 213.*—(*A. P.*)

Disinfection in Tuberculosis.—The value of fresh air and sunshine, and the use of an abundance of soap and hot water need constant emphasis and reiteration in all propaganda. The standards of personal hygiene and household cleanliness are at present so low that disinfection in tuberculosis cannot be dispensed with. The care of heavily infected persons and the dilution of infection are also important. A distinction should be made between advanced cases expectorating large numbers of bacilli and closed cases, otherwise the system of disinfection may be brought into disrepute. An ordinary household spring cleaning suffices with the closed case, but a periodical disinfection of a more elaborate kind is necessary in the case of a patient discharging tubercle bacilli. So long as very advanced cases continue to receive domiciliary treatment, so long will advice and watchful supervision of the household be necessary. Merely to apply disinfection measures when the case terminates is to lose the early opportunity of protecting other members of the household.—*Disinfection in Tuberculosis, E. Ward and S. R. Gloyne, Tubercle, September, 1928, ix, 561.*—(*W. I. W.*)

Tusputol, New Disinfectant for Tuberculous Sputum.—*Tusputol* is a brown

clear, oily fluid, consisting of emulsified phenols, and containing a slight amount of alkali excess, in the proportion of 1:3 in oleic acid. It produces in active 5 per cent concentration a white soapy stable suspension. In 5 per cent suspension and in the proportion of 2:1 in sputum, *Tusputol* kills tubercle bacilli in the majority of cases after one hour, and definitely in all cases in 2 hours. —*Tusputol, ein neues Desinfektionsmittel für tuberkelbacillenhaltigen Auswurf, K. Klein and Heimannsfeld, Beitr. z. Klin. d. Tuberk., 1927, lxvi, 494.—(H. J. C.)*

Social Aspects of Tuberculosis.—Tuberculosis, besides being a disease of individuals, is likewise a disease of social groups, for the disease takes its "general character from the type of social group in which it happens to prevail." It differs in children and adults, in rural and urban groups, and between racial groups. In rural environments death from the disease tends to occur in early adult ages, and in urban districts in middle life, while among miners death from tuberculosis occurs mostly in old age. Anti-tuberculosis measures should be applied only in accordance with these facts. "The laws of the adaptation of individuals or communities to their environment" are the natural laws behind the orderly variations in "social" tuberculosis. The adaptation of man to his bacterial surroundings is individual, but the bacterial (tubercle bacillus) environment is social and will vary with the density of population, percentage of infection, etc. It is in this mutual relationship that the social variations of the disease have their origin. In the country, where the density of population is low, there are few opportunities for contact with "small doses," and exposure, if it occurs at all, occurs in the homes of infected persons, and the risk from this type of exposure to "large doses" is greater than in urban districts where there are many more opportunities for "small doses" which protect against occasional exposures to "large doses" and thus the chances of adaptation are greater. The following may be laid down as "the laws of human adaptation to tuberculosis": "*1:* There can be no adaptation to tuberculosis without previous contact with the tubercle bacillus. *2:* Within certain limits, the degree of adaptation to tuberculosis varies with the amount of previous contact with the tubercle bacillus or with the extent to which such previous contact has led to infective foci in the tissues. *3:* In persons successfully adapted to tuberculosis, the presence of infective foci in the tissues is consistent with health; and such persons are, on the one hand, relatively resistant to reinfection and, on the other, are liable to a progressive development of their preëxisting infection into chronic disease if exposed to undue physiological or pathological stress or to massive 'reinfection.' *4:* Adaptation to tuberculosis, through previous infection, is calculated to modify the whole machinery of response to subsequent reinfection. *5:* In persons unadapted or only slightly adapted to tuberculosis, exposure to massive infection is likely to result in acute, progressive and rapidly fatal disease." The sanitarian in the rural districts is thus called upon to keep the "infective potential" of the environment to safe limits by providing hospitals for isolation of the advanced cases and preventoria for children from infected homes rather than by spending too much on sanatoria. In the more *adapted* areas the important item should be to protect infected persons from the unfavorable conditions which may lead to a breakdown, to provide sanatoria for treatment of early cases. It is especially in such an environment that measures of general hygiene, better wages and food, etc., are of great importance. The management of the sputum-positive person who is able to work is a problem. Fortunately he is much more common in urban (adapted) than in rural regions, but here his exposure to children must be looked after carefully.—*Tuberculosis as a Social Disease, S. L. Cummins, J. State Med., January, 1928, xxxvi, 21.—(H. S. W.)*

Preventive Medicine in Tuberculosis.—The National Tuberculosis Association has procured histories of 1,499 white patients prior to their first admission to a sanatorium. Four questions were asked each patient, in an attempt to learn to what extent preventive medicine had been practised in the advice given them by their physicians. These questions related to instruction as to the disposal of sputum, use of separate dishes, washing dishes separately, and sleeping alone. About 42 per cent of the entire group had never been told how to dispose of the sputum, although they had consulted from one to fourteen physicians each. Of those receiving such instruction, the majority received the advice from the first physician diagnosing the ailment, but approximately 15 per cent had no instruction until they had been treated by two or more physicians. About 47 per cent of the group failed to receive any instruction as to the proper washing or care of their dishes prior to admission to an institution. Approximately 63 per cent were told to sleep alone, more receiving instruction on this point than on any other preventive measure. Such difference as existed between the sexes as to the percentage receiving instruction was in favor of the

women. Fewer patients who were able to have care in a private sanatorium were properly instructed than those admitted to public institutions. It was noted that, considering the whole group, the further advanced the disease at the time of admission, the more apt was the patient to have received advice regarding preventive measures. Most sanatoria provide the patient with a booklet of printed instructions, to supplement such oral advice as they may receive. This is especially needed for patients who are delayed in receiving institutional treatment. Seventeen per cent of the entire group had received printed instructions, more so in the case of the women and among the moderately advanced cases. The proportion of patients instructed varied with the communities served by the sanatoria and the extent to which their interest in preventive medicine had been aroused. The study would indicate that in the medical profession as a whole insufficient thought is being given to preventive medicine.—*Preventive Medicine as Applied to Tuberculous Patients, L. R. Williams and Alice M. Hill, J. Am. M. Ass., March 9, 1929, xcii, 774.*—*(G. L. L.)*

Tuberculous Infection among Massachusetts School Children.—In 1924 the Massachusetts Department of Public Health began a ten-year program of examination of school children of the state, with the purpose of finding those children who had "primary" or "juvenile" tuberculosis, and by supervision and treatment raising their resistance sufficiently to avoid the development later of the "secondary" pulmonary form. This study is based on 42,071 children examined and tuberculin-tested (von Pirquet) during a three-year period. In 1927 Chadwick and Zacks published a study of 25,000 children, featuring the relation of nutrition to infection. As at that time the percentage of positive reactions bore no relation to nutrition this factor has not been included here. *Results:* Some interesting facts were brought out by a study of different sections of certain cities. In general, where living conditions were substandard, the percentage of reactors was high. In one Atlantic coast town of 60,000 some sections showed over 5 times the percentage of others. The junior high schools showed a slightly lower figure than the city as a whole, and the upper grades less than the lower. No striking variation according to national origin was evidenced. Generally the Latin-race groups have the highest percentage of both contacts and infections. The reactors among the boys exceeded those among girls by over 24 per cent for the Irish, 50 per cent for the Canadian, 52 per cent for the Teutonic. In Framingham the percentage of reactors had receded from 33.3 per cent (Bartlett, 1917) to 24.8 per cent (State Clinic, 1926). For the age-group 3 to 7 the reduction had been from 43.9 per cent (Bartlett, 1917) to 19.7 per cent (State Clinic, 1926). It would thus seem that a substantial decrease in tuberculous infection had occurred in Framingham in the nine years following the initiation of the Community Health and Tuberculosis Demonstration. *Summary: 1:* Among 42,000 children studied there is a gradual trend upward of tuberculous infection (shown by positive cutireaction) from 21 per cent at 5 years to 28 per cent at 10 and 35 per cent at 15. The group average was 28 per cent. *2:* Different sections of the same city showed wide variations, congested areas showing the highest percentages of infection. The variation in one city among school districts was from 11 to 60 per cent. *3:* Chronic forms of the disease are more dangerous as regards infection than the acute, and twice as many reactors are found where there is history of contact. *4:* Boys of the Irish, Canadian and Teutonic groups showed a much higher incidence of infection than girls. *5:* The reduction in infection evidenced at Framingham checks up with the reduced mortality in Massachusetts for all forms, that is, from 144 per 100,000 in 1917 to 73 per 100,000 in 1927. Three important factors have operated in this reduction of infection: *1:* The steady decline in the death-rate results in fewer persons with tuberculosis being at large to spread infection. *2:* Segregation in institutions is better carried out, the state having a little more than one bed per tuberculosis death. *3:* Pasteurized milk is now available for about 60 per cent of the population, and this reduces the possibility of bovine infection. A systematic plan now being put into effect for area testing of cattle promises a further reduction and deserves public support. *Deductions:* The tuberculin survey herein reported will afford a basis by which to measure the incidence of infection when comparable studies are made in future years. Certainly tuberculous infection is far from universal in Massachusetts. The increase from the ages 5 to 15 averages 1 point per year. At this rate, the incidence of infection at 30 should be but 50 per cent. Testing of a large group of adults would determine this. Again, with the marked decrease in the number of infected persons, tuberculin tests become of diagnostic value in young adults as well as children. Intracutaneous testing, beginning with 0.01 mgm., followed by 1 mgm., and this by 10 mgm. without reaction permits the exclusion of tuberculosis in many suspected persons.—*The Incidence of Tuberculous Infection in*

School Children, H. D. Chadwick and D. Zacks, New England J. M., February 14, 1927, cc, 332.—(A. P.)

Tuberculosis Mortality in Belgium.—Recently Olbrechts outlined the general course of tuberculosis mortality in Belgium during the past seventy-five years, showing that the rate had diminished constantly and regularly excepting during the war period, which was characterized by a marked recrudescence. The present study proposes to determine how this improvement is distributed among sex and age-groups. Only pulmonary tuberculosis is considered, because the information concerning tuberculosis of other organs lacks precision. *Curve in the Sexes:* The feminine mortality is shown notably higher than the masculine throughout the period prior to 1870, but since 1887 the difference has gradually lessened, though wider than ever from 1880 to 1887. In the year 1888 it happened that the feminine mortality fell below the masculine. Since the end of the war the rates for the sexes have been almost identical. The large cities of Brussels and Antwerp, on the other hand, have shown constantly a higher masculine mortality, although the curves tended to approach one another in the decade prior to 1900. During the War, however, the masculine mortality rose faster than the feminine, and returned more slowly. To sum up, the notion of an earlier decrease in female mortality is confirmed, with a present tendency toward equality. In some other countries, such as England, Wales, Scotland and Sweden, the situation has been analogous, while in others, as Switzerland and the Low Countries, the relation has been practically reversed. It is thought that in Belgium the measures adopted for the protection of women workers have played an important part, especially since during the pressure of War, with its demand for female labor, the mortality rate grew alarmingly. *Age Mortality Curves:* Prior to 1870 the statistics were quite complete for each five-year period, but from 1870 to 1887 they were full of gross errors, being lumped together with other respiratory diseases, and divided into only two age-groups for those over 20,—less than 50 and over 50. The graphs, as far as they can be studied, show the following: *1:* The tuberculosis mortality has diminished constantly for all age groups, in both sexes. The fall has been most marked in infants under a year and persons over 20. *2:* The general distribution is similar for both sexes. *3:* The minimum rate lies between 2 and 7 for girls and 7 and 15 for boys; the maximum between 1856 and 1866 was in subjects over 50, but in 1920 was, for females, between 15 and 20, and for males between 20 and 50. Similar curves have been noted for England and Wales, Bavaria, Switzerland and Holland. *Conclusions:* The incomplete Belgian statistics indicate: *1:* The pulmonary tuberculosis mortality rate, at first higher for the female sex, is now almost the same for both sexes. *2:* The age-distribution for the two sexes was roughly similar, with a minimum between 2 and 20 and a maximum between 20 and 50. Minor discrepancies have been pointed out. Graphs are appended.—*Contribution à l'étude de l'évolution de la mortalité tuberculeuse en Belgique, E. Olbrechts, Rev. Belge d. l. Tuberc., May-June, 1928, xix, 108.—(A. P.)*

Positive Tuberculin Skin Reactions in Belgium.—These tests were made with crude tuberculin, obtained and prepared similarly to Old Tuberculin, but using a culture of equal parts human and bovine bacilli. *Technique:* The control scarification was made, sometimes dry, sometimes with ordinary glycerine-bouillon concentrated as for tuberculin, but containing no culture. The Pirquet borers were abandoned in favor of Blanzy's vaccinostyles, one being used for the control, the other for the two test scarifications. The pen, after being dipped in the concentrated bouillon, was turned with the middle of its anterior face to the forearm, the skin stretched out, the adherent drop placed on it, and through this the pen was drawn lying flat, making 3 or 4 scarifications in each direction. The pen-point should divide the superficial and middle epidermal layers, penetrating to the basal layer, but incision of subepidermal vessels must be avoided. The recording of the reactions was done, sometimes after twelve hours (precocious reaction), always after twenty-four hours, and usually after two days, quite often after four to six days and nearly always after eight to ten days, the degree and duration of any reaction being noted and classified. *Interpretation:* The reaction is considered negative and marked R− when it is similar to that of simple traumatism, as in the control, that is, a simple linear redness. It is marked R+ when the scarified region presents a redness and slight swelling. Between this and a clear negative are about 3 to 5 per cent doubtful or borderline reactions marked R?. These may consist of a more marked redness than the control, but the redness is fugaceous, and with little or no swelling. A double-positive (R++) consists of a definite papule with a surrounding red zone beyond the scarification. A triple-positive (R+++) shows, in addition, small vesicles and slight

necrosis. The practical interest of the cutireaction is based on the generally recognized fact that a positive reaction, with rare exceptions, is specific of the tuberculous "state" and that every tuberculous subject, with rare exceptions, shows such a positive reaction. When the reaction is doubtful it should be repeated. *Results:* In this study it was personally applied during the years 1912 and 1913 to 8,177 Belgians, including (1) inmates of mental asylums, (2) members of penal (?) colonies, (3) prisoners, (4) inmates of charitable schools, and (5) of schools for the defective, (6) inmates of orphanages, and (7) those in maritime sanatoria. Of the entire number, 84 per cent reacted positively, the smallest proportion (60 per cent) being found in the maritime sanatoria, the largest (98 per cent) in the penal (?) colonies. *1: Mental Asylums:* There were 7 such, 2 for women and 5 for men. The proportion of positive reactors ranged from 81 per cent in asylum no. 2 to 100 per cent in no. 7, with a figure of 90 per cent for the entire group. It seems obvious that some abnormal conditions must exist in no. 7. *2: Penal (?) Colonies:* There were 3, of which one showed 100 per cent positive reactors, the others 98 per cent. Age and social condition may account for these high figures. *3: Prisons:* There were also 3 of these, showing 89, 93 and 96 per cent positive reactors. The two largest prisons (at Gand and Louvain) were not studied. *4: Charitable Schools:* There were 7 of these, with a total of 2,275 pupils, of whom 68 per cent reacted positively. One school, divided into two sections according to age, showed 38 per cent positives among those under 14 years, and 54 per cent among those of 14 or more. School no. 6 showed 96 per cent positive reactions, too high a figure, for which some local cause of infection must be sought. *5: Schools for Defective Children:* There were 3, with 1,055 pupils, 74 per cent of whom gave positive cutireactions. The figures were 80 per cent for the one girls' school, 68 and 70 per cent for the two boys' schools. *6: Orphanages:* One of these, for boys (205), was located in the city and yielded 79 per cent positive reactions, the other, for girls, (23) was in the country and only 26 per cent were positive. In the case of orphanage no. 1 (in the city) those children who had been longest in the institution invariably showed the highest proportion of positive reactions. *7: Maritime Sanatoria:* These were two and supposed to accept only tuberculous children. One of these, with a capacity of 81, showed 69 per cent positive reactions; the other, accommodating 60 children, only 50 per cent positive. This can only mean that thousands of children (since the institutions have been established thirty to forty years) who never harbored tuberculosis have passed through them and were considered to have been cured by a maritime cure. Should not a tuberculin cutireaction be required prior to admission and only those reacting positively accepted? Cases of rickets, anaemia, asthenia, even coxalgia, have nothing in common with tuberculous infection. *Age Incidence of Positive Cutireactions:* A complete table is reproduced, covering 6,344 subjects whose age was definitely known, and the following results were noted: *1:* No figures are available for children less than one year of age, as none such were included in the tests. *2:* Children in the second and third year showed 22 and 23 per cent positive cutireactions respectively. *3:* Children aged 3–4, 4–5, and 5–6 years, showed 37, 46, and 50 per cent positives, respectively. For the next two years there was a slight drop, and then a rise to 60 per cent positives at 8 to 9 years and 9 to 10 years. A part of the rises between 3 and 6 years may conceivably be due to ingestion of bovine bacilli. *4:* For the age of 10 to 11 years (84 children) the positives increased sharply to 75 per cent, but again dropped slightly for the next three years. It is suggested that these declines following increases may be due either to infantile mortality or to elimination from the institution of sick children. *5:* At the age of 15–16 there is another sharp rise to 84 per cent with positive cutireactions; then up to the age of 20 comes another plateau, followed by another abrupt rise to 94 per cent. During the rest of adult life the proportion of positives increases by very slow degrees only, to reach 100 per cent at 80–90 years. These results make us believe that tuberculin allergy increases with the duration of tuberculization, which is probably 100 per cent complete at the age of 30. They also suggest that it would be of great practical interest to begin testing the cutireaction in the newborn and repeat it annually, in order to establish gradually when and how man becomes tuberculized and which of the tuberculized develop disease and which of these die.—*Sur la fréquence de la cuti-réaction positive en Belgique, J. F. Heymans, Rev. Belge d. l. Tuberc., May-June, 1928, xix, 97.*—*(A. P.)*

Tuberculosis in Belgian Congo.—In a previous report it was stated that the Government of the Belgian Congo, alarmed by the progressive increase in human tuberculosis, had passed a law enabling the local authorities to take necessary measures to prevent its spread. Since 1923 facilities for the detection of the tuberculous have been

extended and sanitary units organized in the chief centres for carrying out hospitalization. *1: Distribution of Human Tuberculosis:* Medical statistics of cases among natives showed a progressive increase from 1915 to 1922, from 100 to 209, all diagnosed in European inhabited centres. Cultireactions carried out at Lokandu, in the Eastern Province, and at Irebu, Equatorial Province, on soldiers, militia, their wives and children, yielded 4.8 per cent positive at Irebu and 9.5 per cent at Lokandu. School children of 5 to 15 years at the centres of Boma and Leopoldville showed 31.4 per cent positive for Boma and 7.27 per cent for Leopoldville. Analysis of 129 necropsies by Mouchet and Fornara shows tuberculosis in the native to be of a very acute type. Miliary dissemination was found in over one-third, and bone tuberculosis in only 4 per cent. At Leopoldville and Boma, however, chronic sclerosing forms are beginning to appear, evidencing acquired resistance to the infection. The total number of cases discovered in 1925, excluding Katanga province, was 428, of which 344 were pulmonary. Trolli, Physician in Chief and Director of the *Service de l' Hygiène*, has organized a very effective diagnostic service in the larger centres, especially Stanleyville and Leopoldville. At Stanleyville Van Hoof discovered two important foci, in a prison and a troop-camp, and of those living in contact 74 per cent reacted to tuberculin. Cutireactions, done at Leopoldville on 1168 adults living in the town, yielded 50 per cent positive, as compared with 8.6 to 26 per cent in the smaller villages. Among school children the positive reactors increase with age: children of 2 to 4 showed 7.3 per cent positive, and boys of 15 to 18, 46.7 per cent positive. (Van den Branden, Fornara and Staub.) The tuberculosis mortality from January to November, 1925, was 212 per 100,000 inhabitants. The cutireactions at Boma showed 26 per cent positive under 15, and 55 per cent among those between 15 and 18. At Stanleyville 33 per cent positives up to 18 were obtained. The hygienic conditions in these larger centres are very bad and favor diffusion of the infection. Improvement of housing and systematic early isolation of open cases of disease are two very necessary measures. Hospitalization is particularly difficult with the blacks, but the provincial hospitals of Elisabethville and Coquilhatville and most of the district hospitals have tuberculosis pavilions. At Stanleyville an island in the river, difficult of access, has been utilized. In Uélé an annex to the Buta Hospital has been used. Here 38 have been cared for, of whom 18 died and 2 escaped. At Banana, on the seacoast of Congo-Kasai, under the supervision of the Port Physician, patients may be cared for at an infirmary by devoted nuns from the neighboring European sanatorium. Eventually the pulmonary cases are sent to a tuberculosis camp organized by Van den Branden at Leopoldville. This is of brick and wood construction, and from its inception in August 1923 to November, 1925, it admitted 126 tuberculous patients, of whom 68 are dead. Few escapes have been made. Regarding the clinical evolution of the disease, Van den Branden has observed sclerosing forms at Boma as well as at Leopoldville. However, the disease generally runs a serious course, and it is being disseminated and favored by commercial and industrial developments with attendant crowding in the larger centres. Some of the population thus employed carry back the infection into their homes and families. Early detection and isolation and improved conditions of lodging are imperative. Active vaccination by the attenuated Calmette-Guérin bacillus seems applicable to adult blacks coming from new, primitive regions. Facts concerning the frequency of infection are lacking for Uélé, Ruanda and Urundi. In Colombo, however, the Health Physician attached to the employment office at Kinshasa, has carried out the cutireaction in newly recruited workers. Among these the incidence of infection is about 11 per cent, whereas among those who have been in contact with civilization eighteen months it is 32 per cent, and among prisoners 45 per cent. *2: Bovine Tuberculosis:* The only territories of the Belgian Congo where the natives raise large cattle in quantity are the high region of Kion and the grassy slopes around Aru. In these regions tuberculosis seems unknown. In the territories under mandate of Ruanda and Urundi, where human tuberculosis has long been known, the bovine malady seems to be very rare. Since European occupation, however, cattle have been introduced into the uplands of Katanga, Lomani and Kasai. These animals were brought mostly from Rhodesia and Angola. Among the cattle of the Lower and Middle Congo tuberclosis is by no means rare, and appears to be of European origin. There is an important focus of bovine tuberculosis in the central uplands of the island of Mateba, introduced by infected animals from Zambi, near Boma. The animals at Zambi were imported directly from Europe. The minimum of extensively infected animals at Mateba and Zambi is estimated at 11 per cent. At *La Firme Valle*, in neighboring Boma, however, across the river, only 8 out of 547 lungs from slaughtered animals showed tuberculosis.

3: Natural Tuberculosis in the Giant Horned Antelope: The animal referred to is the *Tragelaphus spekei*, the only species encountered on the island of Mateba. Here it has evidently become infected by grazing on grass soiled by the excretions of diseased cattle or hogs. These observations show that natural wild life in the open air is not sufficient to protect animals against tuberculosis and that its rarity among the native African cattle is rather due to lack of contact or opportunity for diffusion. *4: Porcine Tuberculosis:* At both Zambi and Mateba the infection has extended to hogs. The other districts appear to be free from it, although there is likelihood of foci developing near Mayumbi and the Cataractes-Nord, where there are human cases and where the pigs frequent the villages and devour excreta. *Conclusions: 1: Human Tuberculosis:* Generally the disease is rare among natives of the interior of the Congo but well established in the colonies around important European centres. Early detection of open carriers, their isolation, and improvement in housing conditions are the most effective measures to check its spread, and active vaccination with the Calmette-Guérin vaccine seems applicable to a considerable group. *2: Bovine tuberculosis:* This is rare, if it exists at all, among native African cattle, as well as among those introduced into the Lower and Middle Congo from Angola. An important focus, however, has been introduced by European cattle and exists in the island of Mateba. Here also hogs and antelopes have become infected. The selection of cattle to be introduced into a new country should be very carefully done.—*Deuxième rapport sur les infections tuberculeuses au Congo Belge, J. Rodhain, Rev. Belge d. l. Tuberc., July-August, 1928, xix, 143.*—(*A. P.*)

Tuberculosis Mortality in German Community.—The author has prepared a monograph in which an attempt has been made to analyze statistical data in order to establish the relative importance of environmental and hereditary factors in the development of pulmonary tuberculosis. The sum of all hereditary properties is called *idioplasma*. Everything which influences the idioplasma to produce the actual phenomenon of the individual (*phaenotype*) is summed up as "*peristatic factors.*" This dichotomous division is used as a foundation for the present analyses whose aims and possibilities are discussed. The results of this investigation may be summarized as follows: The study embraces the data of a rural community in Baden and covers the years 1852 to 1926. The general mortality of males was higher than that of females (52.4 per cent and 47.6 per cent). The increased male mortality is chiefly due to an increased tuberculosis mortality (64.5 per cent and 35.5 per cent). The increased mortality of tuberculosis of the males occurs essentially after thirty years of age (71 per cent and 28.9 per cent). Since the male mortality from tuberculosis is so much higher than the female mortality after age thirty, while it is approximately the same below age thirty, it is quite likely that this difference is primarily due to occupation. The population of the community under question consists chiefly of agricultural workers, stone-cutters, and artisans. The unusually high tuberculosis mortality of males, particularly between forty and sixty years of age, is due to the high mortality rate among stone-cutters. Other factors which tend to increase the tuberculosis mortality, such as poor housing conditions, deficient nutrition, excessive labor, and excessive alcoholic consumption, influence all three groups of workers and both sexes. The relatively high tuberculosis mortality among artisans during the third decade is most likely due to idioplasmatic factors in contradistinction to the peristatic factors in stone-cutters. This conclusion is supported by the observation that certain artisans, namely bakers, millers and blacksmiths, show a relatively high tuberculosis mortality only in the seventh decade, which indicates a strong constitution. If idioplasmatic factors are operative in the tuberculosis morbidity and mortality, it is necessary to investigate the mode of hereditary transmission. The idioplasmatic factors are evident from the fact that large series of the same filial generation show a very different frequency of tuberculosis, although the peristatic factors (exposure to tuberculosis primarily) were very much the same. It is particularly difficult to establish the mode of hereditary transmission, since the characteristic "tuberculosis" is one which usually develops in later life, and whose potential incidence could not be established in the many individuals dying in early age. All statistical evidence points to the conclusion that disposition to tuberculosis is of a recessive Mendelian character. There can be no doubt that idioplasmatic factors exist in the development of tuberculosis. For practical purposes it will be of great importance to investigate further their relative importance as compared with peristatic factors. It is evident that for a campaign against tuberculosis, eugenic considerations are of equal importance to hygienic considerations.—*Tuberkulose als Todesursache in einer badischen Landgemeinde in den jahren*

1852–1926, H. Munter, Klin. Wchnschr., March 26, 1929, xiii, 606.—(M. P.)

Tuberculosis in Steppes of Kirghise.—While earlier observers remarked on the scarcity of tuberculosis in the Steppes of Kirghise, with the beginning of this century this nomadic region became involved. With Zeiss of Moscow the author examined 1,500 individuals. Of the children examined, ranging from 2 to 5 years, 20 per cent of them were Pirquet-positive while the adults reacted in 90 per cent. Pulmonary tuberculosis predominated, with an absence of lupus and only few cases of lymphatic and joint tuberculosis, which is attributed by the author to the intense sunlight on the steppes. The sanatorium results on these cases appear favorable. Infectious diseases, and especially syphilis, were found to be quite prevalent.—*Die Ausbreitung der Tuberkulose in den Steppen der Kirgisen. (Eine Studienreise im Auftrage der Deutschen Forschungsanstalt für Tuberkulose, Hamburg-Eppendorf.) W. Koopmann, Beitr. z. Klin. d. Tuberk., 1928, lxviii,* 807.—*(H.J.C.)*

Roentgenological Chest Survey for Army Recruits.—A surveying of the cases of pulmonary tuberculosis found in the Hawaiian Department of the United States army for the years of 1923, 1924 and 1925, revealed that too many cases of well-developed phthisis are being passed by medical examiners at enlistments. Eighty per cent of these cases are expectorating tubercle bacilli at the time they enter the service. At least 90 per cent of these cases could have been discovered by a roentgen chest survey at enlistment.—*A Further Study of the Advisability of a General Roentgenological Chest Survey Applied to Recruits of the United States Army, C. L. Maxwell, Am. J. Roent. & Rad. Ther., February, 1929, xxi. 141.—(W. I. W.)*

Antituberculosis Campaign in South America.—Although other important communicable diseases have been greatly reduced in the various republics, especially in their chief cities, tuberculosis continues to make considerable ravages. In Argentina from 1918 to 1926 its mortality was about 200 per 100,000; in Uruguay from 1914 to 1923 (Nario) over 10 per cent of the deaths were caused by tuberculosis, the rate in 1925 being 260.7 per 100,000 people. Rio de Janeiro, Brazil, had a rate, 1903–1918, of about 400 per 100,000, reduced in 1926 to 253 per 100,000. Chile shows still higher rates, namely, 440 per 100,000, with the high rate of 650 per 100,000 in Santiago province. The large cities, as in Europe, show the highest rates (Buenos Aires 250 per 100,000, and Montevideo recording 76.6 per cent of all tuberculosis deaths in Uruguay). On the other hand, it must be kept in mind that many tuberculous patients from the country come to Montevideo to be cared for. The extensive foreign immigration to the cities is regarded as a factor, and climatic conditions are not considered favorable: in Northern Brazil there is much heat and humidity, and in Southern Brazil, Argentina and Chile, sudden changes in temperature. *Argentina:* A new division of tuberculosis prophylaxis has been recently created in the Department of Health. Previously the campaign had been in the hands of benevolent societies, the Buenos Aires charities, and the Argentine Antituberculosis League. The national Department of Health has set up a dispensary for the examination of government employees and their families, and plans a system of dispensaries, hospitals, sanatoria and preventoria. The cost will be in the neighborhood of 4 or 5 million piastres. The present government dispensary, directed by Vaccarozza, consists of (1) a diagnostic department, fitted with laboratory and X-ray facilities, and (2) a therapeutic department, where pneumothorax is especially emphasized. There is also a research laboratory. From 1925 to September, 1927, 5,850 persons were examined and 1,772 treated. *L'Assistance Publique de Buenos Aires,* headed by Emina, has put its tuberculosis work under Raimondi, director of the Hospital-Sanatorium Tornu and the dispensaries of the capital. The former institution has 240 beds, and includes a maternity ward for tuberculous women, who are admitted at their fourth month of pregnancy. Adjoining it is the obstetrical ward. At birth the children are separated from the mothers, placed in a special pavilion, and vaccinated with *BCG,* after which they are placed under medical and nursing supervision. The Rocca gift has made it possible to establish a preventorium for children from 2 to 8 or 10 years of age, accommodating 500. Connected with the Hospital Tornu is the central dispensary of *L'Assistance Publique,* which also maintains 7 other dispensaries in the capital, each under a director who receives 500 piastres per month, with a medical inspector for domiciliary visits and supervision at 350 piastres, a laboratory director, visiting nurses, and chief clerk and assistant. Patients followed receive a litre of milk per day, 800 gm. of meat, 500 gm. of bread, and 2 eggs (total cost 20 piastres). *L'Assistance Publique* has also 450 beds for tuberculosis at the Hospital Muniz. The Argentine Antituberculosis League supports or sub-

sidizes four other dispensaries, and certain special organizations four more in the Capital. At La Plata there is a dispensary founded by the Buenos Aires Department of Health and one by the Antituberculosis League, while at the capitals of Cordoba, Santa Fé, Entre Rios, San Juan and Catamarca are 20 more public or private dispensaries. The only national sanatorium is that of Santa Maria, with 700 beds, in la Sierra de Cordoba. The *Société de Bienfaisance* of Buenos Aires maintains the Hospital-Sanatorium Vicente Lopez y Planes, with 538 beds, also subsidized by the government, and the maritime sanatorium of Mar del Plata, with 232 beds, together with a solarium with 80 beds. The region of Cordoba, by reason of its altitude and dryness, contains most of the sanatoria, both public and private. Among the latter the Sanatorium d'Ascochinga is worthy of note, being very completely equipped and administered by a private organization founded by Mainini, Viton and Morquia. To sum up the government resources, it has only 1,387 beds for tuberculosis in Buenos Aires and 3,284 throughout the republic, which is considered insufficient, but plans to rapidly increase these. The School for Visiting Nurses, directed by Carbonell, deserves mention, as well as 6 fresh-air schools for 2,500 children under the National Council of Education. The bacteriological laboratory of the province of Buenos Aires, directed by Arena, is preparing and distributing Calmette's *BCG* vaccine, and Quiroga, head of the veterinary research laboratory, has repeated and confirmed the animal experiments made with this. *Chile:* Tuberculosis and typhoid fever are the only formidable infectious diseases here, there being no malaria and only a few small foci of typhus. The birth-rate is high, women marrying at 15 or 16. The Chilean Antituberculosis League maintains a preventorium at Santiago and the Benevolent Society of Valparaiso a sanatorium at the foot of the maritime Cordilleras, while the government maintains the Hospital St. Joseph at Santiago for the incurable tuberculous. Finally, there is a notable work accomplished by the Ladies' Antituberculosis Association. Its president, Mme. Swinburne de Jordan, having read of Calmette's work at the Dispensary Emil-Roux at Lille, decided to establish two such at Santiago, with the help of the Association. These are directed by Moreno and others will doubtless follow. Since early in 1927 the *BCG* vaccine has been administered to 400 newborn children, as prepared by Sepulveda, while Matte of the Biological Institute has vaccinated over 2,000 cattle. Monckeberg has also decided to employ it in the fine maternity hospital of 4,000 which he directs. The initial introduction of the vaccine is due to Fontecilla who brought it from Paris. *Uruguay:* At Montevideo the Uruguayan Antituberculosis League directs health propaganda and medical and social aid. It maintains 4 dispensaries there and 17 in the interior, as well as a 100-bed preventorium at Larranaga, a fresh-air school, and vacation colonies. It intends to create two more sanatoria. The Uruguayan government has only one tuberculosis hospital, Firmin Ferreira, at which 90 per cent of the patients are in an advanced stage. It proposes to construct an institution not too far from Montevideo and a maritime hospital of 200 beds, 100 for nonpulmonary tuberculosis and 100 for the pretuberculous, also a camp for 150 debilitated children. There is one private sanatorium at Larranaga. Vaccination with *BCG* has been introduced by the Council of Health, under the direction of Claveau, Moreau and Rubino. Moreau plans to vaccinate the children of Montevideo and to distribute the vaccine to physicians and hospitals there and in the interior. One-quarter of infantile deaths are at present due to tuberculosis. Visiting nurses will also be employed and records kept. As in Argentina and Chile, cattle are vaccinated either by a government commission or by the veterinary school. *Brazil:* In 1920 the Health Department organized a tuberculosis prophylaxis inspection service. Up to the present its activities are limited to Rio de Janeiro and environs, but it will be extended. It is instructed to register all cases, to set up diagnostic dispensaries, to educate, and to treat the poor without cost. Certain patients are hospitalized, and others visited and assisted at home. A central dispensary examines about 150 patients a day, 8 physicians being employed. It has also laboratory and X-ray facilities, which are utilized as well by 3 other dispensaries. The Brazilian Antituberculosis League maintains two dispensaries at Rio de Janeiro and a preventorium on Paqueta island in Rio de Janeiro bay, which cares for 150 boys from tuberculous families. The *BCG* vaccine is prepared by de Assis at the Brazil Life Institute and administered under the direction of Madeira. Cattle are also vaccinated with the collaboration of the School of Agriculture. French phthisiological scientific work is well known and appreciated by the leading men of these progressive South American states.—*La lutte contre la tuberculose en Amérique du Sud, République Argentine, Chili, Uruguay, Brésil, L. Nègre, Rev. d. l. Tuberc., June, 1928, ix, 344.*—(*A. P.*)

Transmissibility of Tuberculosis.—The human tubercle bacillus is much more limited in its pathogenic potentialities than is either the bovine or avian bacillus. It is essentially nonpathogenic for bovines and doubtless for swine, and affects only man and monkeys. The avian bacillus affects the gallinaceous birds in large numbers, the aquatic fowl more rarely, and swine. It may lead to infection in cattle (as determined by testing with avian tuberculin) but does not cause disease in them. It is interesting and probably significant that avian infection of cattle is not detectable by mammalian tuberculin but is readily detectable by avian tuberculin. Experiments have shown that the common rat is entirely refractory to infection with the avian bacillus. They show, however, that the rat may be a mechanical spreader of the disease to both chickens and swine, especially by passage through the intestinal tract. Sensitization in tuberculosis may be attained by infection with the tubercle bacillus, by the Yersin type of tuberculosis and by repeated injection of tuberculin. Our knowledge of transmissibility, infectivity and sensitivity in tuberculosis is woefully incomplete.—*The Transmissibility, Infectivity and Sensitivity of Tuberculosis, A. F. Shalk, J. Am. Vet. M. Ass., February, 1929, lxxiv (n.s. xxvii), 301.—(H. S. W.)*

Mustard Gas and Tuberculosis.—One hundred and sixty-eight rabbits were inoculated in the vein of the ear with virulent human tubercle bacilli. Half of the animals were gassed for one hour with approximately the lethal dose of mustard gas; the other half were kept as controls. From six to ten weeks after their inoculation, all the animals were killed, autopsies performed, and the viscera studied for tuberculous lesions. Sixty-four per cent of the animals that had been gassed had pulmonary tuberculosis; 83 per cent of the controls had pulmonary tuberculosis. The tuberculous process was much more extensive in the control animals that developed the disease than in the gassed animals that contracted it. These experiments clearly demonstrate that gassing with mustard gas has an inhibitory effect on the development of pulmonary tuberculosis in rabbits.—*Mustard Gas and Tuberculosis, A. R. Koontz, Arch. Int. Med., January, 1929, xliii, 90.—(W. I. W.)*

Intrafamily Spread of Tuberculosis.—The author selected 139 families from 100,000 in which there were no less than two belonging to the first or second generations in whom distinct bacillary disease was present. Among all of these cases there were poor social and home conditions as well as a lack of hygienic knowledge. Among 576 cases belonging to these families there were 151 free from tuberculosis, while 435 were afflicted in varying degree, and there were 39 deaths. In 300 of the cases tuberculosis was determined bacteriologically and in 83 clinically. The families were divided into three groups, the first with both parents having open tuberculosis, the second with only one parent and one or more children tuberculous, and the third representing families in which only children were afflicted with open tuberculosis and the parents could not be proved to have had tuberculosis. The mere statistical material alone did not clarify the question of intrafamily spread, and therefore an attempt was made to determine the contact of the diseased individuals. The question is raised as to why, even in instances of severe intrafamily hazard, there were cases that were protected from disease. In a number of cases this was explained on the basis of external conditions, such as removal from the family. In the remaining cases the author attempts to explain this on the basis of genotypical and constitutional individuality. The isohaemoglutinin phenomenon of Moss was tested. In 10 families there was an agreement between the children and the living adults, with the same grouping of two or four, while in the remainder variable results obtained. An extension of this work is suggested on a larger material.—*Zur Methode des Studiums der intrafamiliären Verbreitung der Tuberkulose, A. M. Glusmann, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 450.—(H. J. C.)*

Meteorological Factors and Pulmonary Tuberculosis.—Up to the present, precise data linking the evolution of pleuropulmonary tuberculosis to specific climatic factors are singularly lacking, although the subject must be considered important from the viewpoint of selection of resorts offering the best chance of cure. To begin with, it is generally conceded that the basis of treatment is the modification of the terrain on which the organism develops by means of the hygienic-dietetic cure. As to selection of locations in which to carry this out, empiricism has governed, and the opinions of phthisiologists are very discordant. Extremely dry climates have been recommended, such as Southern Algeria, high mountainous resorts, such as the French or Swiss Alps; yet Pau, in one of the rainiest regions of France, is flocked to by the tuberculous, and Bligny and Angicourt, near Paris, are the sites of sanatoria which turn out many successful and durable "cures." Recently Lalesque has recommended a marine climate, with a high humidity, while Philippe Lelong

states that humidity should be strictly avoided. In this study the various atmospheric factors are considered separately. *Epidemicity of Pleural Exudates:* At the Hôpital Laennec and Leon-Bourgeois Dispensary this feature has appeared rather striking, especially in connection with therapeutic pneumothorax. Poor sterilization and other technical errors seemed to be ruled out. It was then decided to make a graph, showing the incidence according to months of the year for 259 pneumothorax cases in the service of Rist and Naveau, and this was compared with a similar graph bearing on 184 cases of bilateralization occurring in Naveau's service. It was recognized that there were two obvious possible sources of error: (1) chance and (2) periodic changes in the service, during which observations might be less carefully noted and recorded. Among the pleurisies were included all except those with mere traces in the costophrenic sulcus, irrespective of symptoms, character or duration. There seemed to be a definite cycle, corresponding fairly closely for both pleurisies and bilateralizations, the maxima occurring in May, June and July, and the minimum, less constant, in April. These graphs cover only the years 1921, 1922 and 1923 in the Parisian basin. The meteorological factors for these years were then obtained from the Director of the Observatory of Parc St. Maur. *Comparison of Incidence of Pleurisies and Bilateralizations with Specific Meteorological Factors: 1: Rainfall:* The graph shows no correspondence. The year 1921, abnormally dry, showed more pleurisies than the following two years which were abnormally wet, while bilateralizations were nearly the same. Both the amount and number of days of rain were considered. *2: Relative Humidity:* This curve shows always its maxima in winter and minima in June, July and August, so that the relation, if any, was inverse. *3: Vapor Tension:* This was only had for one year, 1921, and no relation was observed. *4: Fog:* Here again the relation seemed inverse, as the months of May, June and July showed the fewest foggy days. *5: Sunlight:* Although quite generally insolation has been regarded as favorable to the cure of tuberculosis, the graphs failed to establish any relation. *6: Barometric Pressure:* In this case only the monthly means were available and reveal no influence. *7: Temperature:* Again, no influence was observed. *8: Winds:* The mean velocity of the wind seemed to bear no relation, but of course it must be recalled that the patients were not exposed to high winds. The possible relation to prevailing direction of wind was studied, thus: *1: East Winds:* These are usually weak and seemed to have no influence. *2: West Winds:* There was certainly no harmful influence, possibly the reverse. *3: South Winds:* Much the same may be said, despite their reputation as "haemoptysis winds." *4: Northeast Winds:* For 1921 and 1922 these followed fairly closely the curves for bilaterializations and fluids, but this was reversed in 1923, except during December. *5: North Winds:* These paralleled fairly closely the bilateralization and pleurisy curves, two or three months only being excepted. *Summary:* Most, if not all, of the usually accepted detrimental climatic factors, when rigidly scrutinized, seem to play no part in the evolution of tuberculosis. More extended studies will be necessary for a complete evaluation.—*Essai d'introduction d'une méthode scientifique dans l'étude des facteurs météorologiques néfastes aux tuberculoses thoraciques en général, plus particulièrement à la tuberculose pulmonaire, J. Chabaud, Section d'études scientifiques de l' Oeuvre de la Tuberculose, February 11, 1928, reported in Rev. d. l. Tuberc., April, 1928, ix, 268.*—*(A. P.)*

Seasonal Influence on Tuberculosis.—The scarcity of tuberculosis during the past century in the Faroe Islands is disputed, since in 1843 there were 19 cases in the Thornhaven Hospital, four of these being tuberculous. In the years 1879 to 1898 there were 11.8 deaths from tuberculosis among 10,000 inhabitants. The author compares the sunshine curves on the islands with the monthly registered cases of tuberculosis, and there was shown a definite relation from which it is concluded that there is an activation of quiescent processes during the Spring months.—*Die Beziehungen der Jahreszeiten zur Tuberkulose, Heerup, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 739.*—*(H. J. C.)*

Infantile Tuberculosis.—Barbier has carried on clinical and pathological observations for twenty years in his hospital and outside service, and has recently written a volume on *Tuberculose infantile* for Carnot-Lereboullet's classical collection. This article deals with observations on subjects between birth and the age of 15. *Tuberculosis during the First Year:* This is a "primo-evolution," which depends largely on (1) the origin of the infection, (2) the quantity or "dose" of infection, and (3) the time between the infection and the first appearance of a lesion, in other words, the incubation period preceding the period of invasion. The simplest form is a small local lesion following the appearance of a few bacilli somewhere in the lung. This conception of infection, however, is weak in the

case of large initial caseous lesions or lesions of generalized alveolitis. The question of hereditary transmission is passed by, although the constant presence of hepatic and splenic lesions in very young children dead of tuberculosis, the issue of tuberculous mothers, certainly suggests it. From a clinical viewpoint we may divide the children into (1) those born of tuberculous mothers, and (2) those not so born. Some of the latter have tuberculous fathers or other relatives; others seem to come from a healthy environment. Among the first group, so called "hereditarily tuberculous," many are premature, weak and over 1500 gm. below normal birth weight. Others are of normal birth weight but fail to gain after the first few weeks. Nutritional disorders are frequent, even in the breast-fed, and are aggravated by artificial feeding. Some infants die soon, and show principally congestive lesions of lungs and meninges, or insignificant caseous lesions, the clinical picture being that of toxi-infectious phenomena, death occurring before the actual tuberculous lesions have reached any considerable size. On the other hand, there occur acute febrile forms, with lesions of alveolitis, bronchopneumonia, or extensive miliary nodules. The latter are dominated by respiratory symptoms, such as cough, oppression, attacks of suffocation, cyanosis; the former present only digestive symptoms, such as dyspepsia and enteritis. In still other cases the phenomena of grave intoxication are dominant, such as stupor, anaemia, cyanotic pallor, or marantic phenomena,—wasting and progressive cachexia. Certain cases present a pseudoleukaemic anaemia, or multiple cutaneous cold abscesses, pyodermia, or a catarrhal condition of the mucous membranes. A certain number survive progressive attacks but drag out a miserable existence,—dyspeptic and atrophic, with, finally, terminal cachexia or hypothermia. *Patients Dying of Congestive Pulmonary Lesions with or without Bacillary Serofibrinous Meningitis:* The bacillary nature of the congestions may be demonstrated by guinea-pig inoculation or by the finding of tubercle bacilli in other coincident localizations, or by slight lymphatic reactions characteristic of tuberculous foci. Death always occurs rapidly in a few days, with or without meningeal manifestations. Three typical cases are described. *Initial Acute Meningeal Attacks:* These may occur in perfectly developed infants and be fatal in a few days. In other cases death is due to bacillary generalization, skin or intestinal septic infection. Pulmonary foci may be well developed, or there may be only a moderate hilar adenopathy, enclosing a few caseous nodules. Cases in point are cited. There are initial generalized types in which the importance of the pulmonary lesion of "primo-inoculation" does not correspond to the gravity of the generalization. These are often seen in well-developed children of non-tuberculous heredity. *Alveolar or Miliary Pneumonic Lesions:* These may develop with great intensity in a short time, and often the general symptoms again entirely dominate the picture. *Functional Respiratory Symptoms:* Cough is a very frequent initial symptom. It may be accompanied by vague signs of bronchitis or persist following an acute respiratory attack, presumably bronchopneumonic. After some time transient signs of congestion may appear, perhaps with coryza, conjunctivitis, otitis, or morbilliform eruptions; finally there are digestive symptoms, anaemia, wasting, and febrile attacks or permanent fever. Five cases are described. The cough may assume from the onset a spasmodic or paroxysmal character, accompanied by oppression and attacks of suffocation or cyanosis, especially in very young infants. These symptoms are often, but not always, related to rapid lymph-node development, or to mediastinitis and pleural adhesions, or with cavity development. Such attacks in tuberculosis are more frequent during the day than at night, and are sometimes provoked by moving the child about. Five cases are very fully described, in one of which the patient recovered, the others coming to autopsy and showing extensive visceral and lymphatic lesions. Cavities are rare prior to the third month, but from then on are increasingly frequent. Tubercle bacilli are usually, but not always, to be found in the sputum. Often the cavities are enormous, destroying a whole lobe, especially the lower. Multiple small cavities (*en bouquet*) are also encountered, which by coalescence merge into larger ones. Most frequently such involvement is entirely unilateral. Three cases are described. *Dyspeptic Disturbances and Enteritis:* Gastrointestinal disturbances commonly accompany the preceding forms, in varying degree, particularly anorexia, vomiting, and diarrhoea. The stools contain mucus, and are often alcoholic and produce erythema of the buttocks. In some cases these digestive disturbances are the only symptoms, especially in patients showing atrophy and progressive cachexia. This picture is most common in the early months of life. Hypothermia is characteristic. The wasting may be extreme. Three cases are described, all coming to necropsy with extensive lesions. Subcutaneous cold abscesses are seen also in the cachectic forms, or in the very toxic, anaemic or stuporous patients, who generally show a generalized process. Three cases

are described. *Symptoms of Intoxication:* Anaemia, asthenia, stupor, pallid asphyxia, cachexia, atrophy, cachectic oedema. The first group of symptoms, such as waxy anaemia, stupor, pallid asphyxia and profound asthenia, correspond generally to the acute initial forms of confluent alveolitis or extensive caseous pneumonia. These patients, immobile in bed, eyes fixed, face ghastly, extremities cyanosed and cold, respiration superficial, pulse hardly perceptible, appear to be dying, and in fact are dying. They rarely live over a few days. The second group of symptoms, atrophy, cachexia, and oedema, on the other hand is observed during the termination of more protracted forms, lasting several months. Atrophy is most extreme in the "hereditarily tuberculous," the emaciated, especially the premature, who at five or six months have hardly kept their birth weight, and meanwhile have suffered prolonged dyspeptic and diarrhoeal troubles. However, it is most striking when it occurs in children who fall ill only at the end of two to four months, having previously appeared normal. Such grave symptoms of intoxication seem to sometimes terminate an older tuberculous process. Oedema, sometimes transitory, is fairly common at the close of cachectic states, and may give rise to error in weighing patients. Cachexia may be an early symptom, especially in the "hereditarily tuberculous" and the premature, but it is more common at the termination of grave destructive lesions and is especially striking when the previous health has been good. Several cases are described. *Pseudoleukaemic Forms:* Hypertrophy of the liver and spleen is almost the rule in the "precocious" forms of tuberculosis, and constitutes a good sign of probability. It may be accompanied by intense anaemia, with blood modifications of pseudoleukaemic type. The appetite and weight are often surprisingly good, at least for a time. Only later do we have wasting and cachectic oedema. Three cases, with necropsy findings, are described. *Prolonged Forms:* Infantile tuberculosis does not always have the highly acute course mentioned, for many patients live several months, and some drag out a miserable existence for over a year. Reference is made particularly to those with large pulmonary lesions, caseous masses and even enormous cavities, usually limited to one lung. The fever is variable, generally irregular and perhaps interspersed with periods of hypothermia. Digestive disturbances and septic complications are frequent, especially a purulent foetid otitis. It is in the course of such prolonged forms that the diagnosis may be clearly established by finding tubercle bacilli in the sputum (or stools). May a clinical cure occur in these forms? Such an event is unlikely but not impossible, even with tubercle bacilli in the sputum. The coexistence of hereditary syphilis may confuse the picture, as it often gives rise to oedema, ascites, large liver and spleen, mediastinitis and pulmonary sclerosis. Ten examples of the more protracted forms of tuberculosis are given in case reports, most of them accompanied by necropsy findings. *Purulent Pleurisy:* This appears most often following a rapidly developing caseous pneumonia. One case is cited in a child of three months who developed caseous pneumonia at two months.—*Documents pour servir à l'étude de la tuberculose infantile, de la naissance à six mois, H. Barbier, Rev. d. l. Tuberc., August, 1928, ix,* 507.—(*A. P.*)

Tubercle Bacilli in Infants' Stools.—Since the introduction of newer and better technique by Sergent and Durand, and Venot and Moreau, it is of interest to apply this added diagnostic method to tuberculosis in young children, especially as certain pediatrists, notably Lesné in France, consider as contagious any infant with a positive cutireaction and the question of their isolation arises. This study is based on examination of the stools of 19 infants from the *crèche* of Bernard's service. The existence of acid-fast bacilli other than tubercle bacilli in normal stools is not ignored. They were found 6 times out of 22 examinations and could scarcely be mistaken for true tubercle bacilli. *Technique:* The stools are collected in a glass jar, and 0.7 per cent salt solution added to make a liquid emulsion. This is filtered through gauze folded two or three times, and then shaken with 2 cc. of equal parts of ligroin and sulphuric ether. This is shaken and centrifugated ten minutes. Above the upper layer of ether is a cake-like mass, 1 to 2 mm. in diameter, which contains all the tubercle bacilli present. This is broken up, fixed and colored by Ziehl's method. *Results: 1:* Twelve presented a latent infection characterized only by a positive cutireaction, and 38 examinations of their stools were uniformly negative. *2:* Six had a positive cutireaction with slight and variable clinical and roentgenographic signs, and all examinations were again negative, in one case being repeated 20 times. *3:* Two cases had clinical and roentgenographic signs of ulcerative tuberculosis with cavitation, verified at autopsy. These constantly showed tubercle bacilli in the stools. *Conclusions:* This test is of value in the determination of ulcerative tuberculosis, and is always negative in latent or ganglio-pulmonary forms. It may be supplemented

by examination of the gastric contents obtained by lavage (Armand-Delille), and on this basis we may assume the noncontagiousness of infants showing merely a positive cutireaction without positive clinical or roentgenographic findings.—*Sur la recherche du bacille de Koch dans les selles du nourrisson, D. Szüle, Rev. d. l. Tuberc., February, 1928, ix, 49.*—(*A. P.*)

Mediastinal Cyst in Infant.—*Case report:* A three-months-old infant had attacks of wheezing and cyanosis from the time of birth. These occurred at intervals and became more frequent up to the time of death. *Postmortem Findings:* Below the bifurcation of the trachea was a translucent cyst about 1.5 cm. in diameter. It was tense with fluid and pressed against the left primary bronchus, but did not communicate with it. Attached to its posterior surface was a small knob, about 2 mm. in diameter and having the consistency of cartilage.—*A Mediastinal Cyst Causing Obstruction of a Bronchus, E. C. Vogt, Am. J. Roentgenol. & Rad. Ther., April, 1929, xxi, 364.*—(*W. I. W.*)

Prognosis of Tuberculosis in Infants.—Four hundred and four tuberculous infants, varying in age from four months to two and one-half years, all patients in Pirquet's Children's Hospital and Dispensary in Vienna, were followed for a period of from one to eight years. When first examined, 221 showed only a positive tuberculin reaction, 121 showed hilum tuberculosis, 15 scrofuloderma, 5 papulonecrotic tuberculids, 11 spina ventosa, 6 tuberculous pleurisy, 8 epituberculosis, 2 erythema nodosum. In 404 cases there were 15 deaths (3.71 per cent). Twenty-nine of the 404 were infected during the first 6 months of life. Of these 5 died (17.2 per cent). None of the infants infected after the first half of the second year died. Fluoroscopic and roentgenological examinations showed either a Ghon tubercle or clacified hilum lymph nodes in 95.5 per cent of patients followed for 7 to 8 years, and in only 16 per cent of those followed for one to two years. The resistance of the infant to tuberculous infection, even during the first six months of life, is high. An infant with a positive tuberculin reaction or even with a definitely recognizable lesion (except tuberculous meningitis, miliary tuberculosis and ulcerocaseous pulmonary tuberculosis) should not be given a poor prognosis.—*The Prognosis of Tuberculosis in Infants, B. M. Gasul, Am. J. Dis. Child., May, 1929, xxxvii, 909.*—(*P. J. W.*)

Pulmonary Tuberculosis in Young Children.—According to most classical ideas infantile pulmonary tuberculosis presents characteristics of diffusion, generalization and rapid evolution. Recent works, on the other hand, remark curable forms, of which there persist only very limited lesions described since Parrot by the term "chancre of inoculation." A comprehensive study will show that "gangliopulmonary tuberculosis" in the young child presents many more anatomical types and variations than either of the two above conceptions includes. Since the advent of roentgenoscopy and roentgenography and their wide application, many different kinds of shadows have been observed and classifications have been frequently attempted. The authors do not believe that a clinicopathological classification based solely on roentgenography is possible, and they consider it sounder to begin with Laennec's classic differentiation, adding to it information derived from these latter sources. To determine the consecutive evolution of various stages, serial or repeated X-ray films are most desirable. Much of this material has been gathered through the dispensaries of the *Office Publique d'Hygiene Sociale*, the physicians of which have referred doubtful cases. The pathological sections reproduced have been made by frontal sections of the thoracic contents, hardened *en bloc* in a mold of suitable dimensions. Tracings may be made of these and juxtaposed to roentgenographs. *1: Tracheobronchial Adenopathy without Active Pulmonary Lesions:* It is possible to determine, in subjects dead of intercurrent infections, gross lesions of tuberculous tracheobronchial adenopathy, entirely caseified, situated on either side of the trachea, below its bifurcation, or above the right bronchus or aortic arch. These masses, as one can determine by tracings, are almost entirely hidden by the cardiovascular shadow, and ordinary roentgenographs fail to show them. Only examination of the clear posterior mediastinal space is helpful. In such cases the lungs often appear free from all tuberculous localization, but close examination of a series of frontal sections will almost always disclose in the parenchyma a small caseous nodule the size of a pea, surrounded by a sclerotic zone, styled by Parrot and Küss the "chancre of inoculation," and by Ghon and Aschoff the "primary lesion," which, together with its corresponding adenopathy, makes up what they call the "primary complex." It may be remarked, however, that the so called "portal of entry" may be in the lung on the opposite side to the caseous adenopathy. *2: Tuberculous Lesions of Pulmonary Parenchyma:* It is well known that in children such lesions always coexist with tracheobronchial adenopathy.

The parenchymal lesions take the form either of miliary or localized lesions. *A: Miliary Granulations:* These occur as (1) small isolated granulations, such as accompany miliary complications; (2) typical miliary granulations; and (3) larger, progressive miliary granulations, with central caseation. In one case a small group of sago-like granulations shown by X-ray permitted an antemortem diagnosis; there were also two shadows outside and above the clearness of a bronchus, corresponding to suprabronchial glands. Deviation of the trachea to the right was caused by an enormous intertracheobronchial mass invisible in frontal roentgenographs. *B: Localized Lesions:* (1) The chancre of inoculation, instead of being reduced to a cicatricial remnant, shows as a large caseous mass, often surrounded by a zone of extensive condensation. It nearly always shows in its centre a little softening which may give rise to a cavity. Such cavities are quite often in the lower lobe. The surrounding congestive lesions show here and there small caseous points (tuberculous alveolitis undergoing caseation). It is a mistake to describe such a picture as "epituberculosis," especially if large lymph-node masses are also present. (2) The primary lesion may occur as a bloc of massive caseation involving a lobe. (3) There may exist, along with a quite limited primary lesion, a bronchopneumonic type of lobar infiltration; on section the tuberculous lesions are disposed in clover-leaf fashion around the bronchial ramifications. (4) There may be a massive infiltration of both lungs, a terminal process. (5) Occasionally a tuberculous splenopneumonia follows measles. Sections show the "chancre of inoculation" in the other lung in one case described, with small caseous nodules at the base of the involved lung, the apex being clear. *Summary and Deductions: 1:* Roentgenography is almost the only means of early diagnosis of pulmonary tuberculosis in early childhood, when such general signs as fever may be absent and auscultatory signs may be doubtful, absent, or capable of confusion with those of simple bronchopneumonia or bronchitis. Tubercle bacilli should be sought for in the gastric contents. The cutireaction, while of some value, is not proof of the tuberculous origin of the symptoms. *2:* It would be well to drop the term "epituberculosis" in such cases as described. Anatomically, primary tuberculosis tends to be lobar, and tuberculous lobitis is the usual form in the child. The appearance of perihilar condensation is due perhaps to the fact that in the middle and lower lobes the bronchi ramify in a spreading bouquet form especially marked in an anteroposterior plane, causing the lesions to appear in juxtaposition to the hilum. Lesions in the costophrenic region on the right are apt to be hidden by the shadow of the liver, while those in the left costovertebral region are masked by the heart shadow. *3:* True "epituberculous" lesions are rare, and, although the first localization and reaction in the child's lung may be curable, one should be cautious in the presence of dense lobar or semilobar shadows. If these persist, and especially if lavage of the stomach shows bacilliferous sputum, a pneumothorax ought to be done to effect a cure before the localization has spread outside of the lobe. Cicatricial sclerosis is accomplished as well in children as in adults. Several pathological sections and roentgenographs are reproduced.—*Note sur les principaux aspects anatomiques de la tuberculose pulmonaire des jeunes enfants, au point de vue de l'interprétation des radiographies. P. Armand-Delille and C. Lestocquoy, Section d'études scientifiques de l'Oeuvre de la Tuberculose, November 12, 1927, reported in Rev. d. l. Tuberc., February, 1928, ix, 62.*—(*A. P.*)

Tuberculosis in Childhood.—In the year 1926 tuberculosis was responsible for 8.3 per cent of all deaths in England and Wales, while 14.5 per cent of all deaths from tuberculosis occurred in children below the age of fifteen. The disease is uncommon during the first eight months of life, but after this the liability to infection increases rapidly, reaching its height at the age of two years. Tuberculosis of the bronchial lymph nodes, tuberculous bronchopneumonia, generalized tuberculosis and abdominal tuberculosis are the commonest forms seen in children. The prevention of contact with human sources of infection, the proper sterilization of milk, and the maintenance of a high standard of general bodily health are the best safe guards we can give a child against tuberculosis.—*Tuberculosis in Childhood, B. Schlesinger, Brit. M. J., April 27, 1929, no. 3564, 759.*—(*W. I. W.*)

Open Tuberculosis in Childhood.—We are learning much more about tuberculosis of childhood. Much that was formerly thought of as croupous pneumonia or unresolved pneumonia was probably beginning tuberculosis. The tuberculin reaction is very helpful in the diagnosis, but one must not make the mistake of assuming that all who have a pulmonary affection and a tuberculin reaction have tuberculosis, except among the very young. In older children and in adults, bronchiectasis and asthmatic bronchitis are frequently diagnosed tuberculosis. Careful examination of the sputum is

of the greatest importance, although it is difficult to obtain the specimen in small children. Various manoeuvres must be employed to get sputum. The stool and gastric contents should be examined. Culture methods (concentration, etc.) are helpful but are not as much so as animal inoculation. Children with suspected tuberculosis and with epituberculosis were found in numerous instances, by culture and animal inoculation of sputum, to be "open" cases of tuberculosis. One disadvantage of animal inoculation is the necessarily long time that must elapse before results are obtainable. In one-half of the children with tuberculosis the source of the infection is not known. Every means for detecting such sources should be employed. In several groups of cases the relative value of microscopic, cultural and animal inoculation was studied with the following results: Definite tuberculosis, suspected tuberculosis, epituberculosis, interlobar process and bronchiectasis were all represented. Of 33 cases, direct examination revealed tubercle bacilli in 8; culture methods revealed tubercle bacilli in 10; and animal inoculation revealed them in 21, including bronchiectasis.—*Zur Frage der offenen Tuberkulose in Kindesalter, H. Opitz, Deutsche med. Wchnschr., December, 1928, liv, 2175.*—(*H. S. W.*)

Primary Tuberculous Infection in Childhood.—The primary infection was formerly determined by a change of tuberculin hypersensitiveness, but the initial reaction as well as fever is of no significance. A change in conception was brought about by the description of the primary infiltration by Redeker, which made possible a roentgenological and frequently clinical recognition of the perifocal reaction. It is of significance that this perifocal inflammatory reaction need not necessarily occur in the secondary stage, but can develop in the early primary stage before the development of the primary complex. The author reports 2 cases in which, in the presence of a prior negative tuberculin reaction, there occurred another infection, in the one case due to the visit of a phthisical aunt and in the other contracted from a playmate, with resultant primary infiltration, once apical and the other time perihilar. In each case it was initiated with a severe febrile condition. In the apical case there occurred retrogression to a primary complex and in the other case to hilum "flakes." It is interesting, in verification of Redeker's conception, that not rarely a roentgenological and clinically determinable primary infiltration can occur even before the peripheral tuberculin reaction is positive.—*Zur Klinik der tuberkulösen Erstinfektion im Kindesalter, E. Rominger, Zeitschr. f. Tuberk., 1928, l, 113.*—(*H. J. C.*)

Mediastinal Diaphragmatic Pleurisy in Children.—The author reports 5 cases of mediastinal diaphragmatic pleurisy occurring during a year's period of observation on 650 tuberculous children. The seat of the disease was the anterior mediastinum in three, and the posterior mediastinum in two. In one of the cases the pleural affection predominated in the disease picture, and in the other four it was a condition associated with pulmonary disease. In one case there was a fresh effusion, and in four there were more chronic changes. The aetiology in all the cases was tuberculosis. The cases predominantly belonged to the secondary stage and the diagnosis was primarily made by roentgen examination.—*Über die Pleuritis mediastino-diaphragmatica im Kindesalter, H. H. Knüsli, Beitr. z. Klin. d. Tuberk., 1928, lxviii, 160.*—(*H. J. C.*)

Avian, Human, and Bovine Tuberculin Reactions in Children.—It has been shown that there are undoubtedly cases of avian tuberculosis in man, and that the clinical picture of avian tuberculosis may differ from the tuberculosis caused by the human and bovine types. In 110 children with pulmonary tuberculosis, all of whom reacted positively to the human and bovine tuberculin, no reaction to avian tuberculin was obtained with the usual Pirquet test. No appreciable differences were noted between the reactions to the human and the bovine types. Avian tuberculin appears to be specific for tuberculosis caused by the avian type of tubercle bacillus only.—*Avian, Human, and Bovine Tuberculin Reactions in Children, B. M. Gasul, Arch. Pediat., February, 1929, xlvi, 67.*—(*P. J. W.*)

Percutaneous Tuberculin Reaction.—The present method of performing the modified Moro test in the Children's Clinic at Graz is as follows: The skin over the sternum is rubbed with ether until hyperaemia occurs. A piece of concentrated old tuberculin, the size of a pinhead, is vigorously rubbed in with the finger-tips. The result is read at the end of forty-eight hours. Three grades of positive reaction are described,—weak, moderate, and strong. If performed with concentrated tuberculin, the Moro test yields fully as many positive results as the Pirquet test, and of course has the advantage of painlessness. From 15 to 20 per cent of the percutaneous tests are unreliable as indicating tuberculous infection; this is true chiefly in advanced cases

of tuberculosis and in cases with acute fever. Thus this test must at times be followed by the more sensitive tests, such as the subcutaneous injection of 0.01 to 1 mgm. (never during the period of hypersensitiveness occurring five or six days after an injection).—*The Percutaneous Tuberculin Reaction, B. R. Lovett, Am. J. Dis. Child., May, 1929, xxxvii, 918.*—*(P. J. W.)*

Early Diagnosis and Treatment of Pulmonary Tuberculosis in Children.—The symptoms and signs of pulmonary tuberculosis in children are outlined. The importance of making a diagnosis from symptoms and from history of exposure, rather than waiting for definite physical signs to make their appearance, is emphasized. In pulmonary tuberculosis, respiration is impeded, the vital capacity of the lungs is decreased, aeration is imperfect, and an anoxaemia is produced. Successful therapy requires systematic ventilation or hyperventilation to overcome oxygen deficiency. Graduated lung exercises by progressive deep breathing, walking at a graded pace, or by suitable games with the respiratory response as an index, will do much good in incipient, mild and quiescent tuberculosis. They will ventilate the lungs, strengthen the respiratory system, increase the power of the circulatory system, improve the general muscular tone, and aid in overcoming chest deformities.—*Early Diagnosis and Early Treatment of Pulmonary Tuberculosis in Children. Pulmonary Ventilation, J. Epstein, Arch. Pediat., April, 1929, xlvi, 239.*—*(P. J. W.)*

Demonstration of Tubercle Bacilli in Young Children with Pulmonary Tuberculosis.—An elaboration of the Meunier method is described as follows: In the morning, after the child has fasted at least 6 hours, the stomach is washed with 200 to 300 cc. of sterile water, the wash-water is centrifugated, the sediment homogenized, stained after Ziehl-Neelsen's method, and examined. The authors did not stop at microscopic examination, but made cultures from the sediment on Petroff's medium, and inoculated guinea pigs. In one group of 6 children, one was two years of age, and the other five from 7 to 10 months; all were clinically tuberculous, and five had been exposed to infection. The child aged two is living and improving; the other five have died. Microscopic examination of the sediment showed tubercle bacilli in four of the six cases. Culture and guinea-pig inoculation were positive in all. The second group numbered 5 children, one being one year old, the others from five to eight months. Exposure was known in four of the cases. All five gave a positive tuberculin reaction, but in none of them were physical signs of tuberculosis present. X-rays revealed infiltrations in the lungs in all five, but these were pronounced in only one, who also suffered from tuberculosis of the joints and of the peritoneum. The other four are steadily improving. In only one of this group could tubercle bacilli be demonstrated under the microscope; but culture on Petroff's medium gave growth in four cases, and guinea-pig inoculation of sediment from the stomach-washings was positive in all five. Of all 11 patients, none had any tuberculosis of the tonsils. In a third group of four patients, from 1 to 8 years old, one gave a positive family history; all four had positive tuberculin tests; physical and X-ray examinations were negative in three, and positive for infiltration in the right lung in the fourth. Microscopic examination, culture, and animal inoculation were negative in all four cases. The value of this method in detecting open cases of tuberculosis in infancy is apparent. The laboratory part of the work, however, is time-consuming and expensive.—*The Demonstration of Tubercle Bacilli in Small Children with Pulmonary Tuberculosis, V. Poulsen, K. A. Jensen and E. Husted, Am. J. Dis. Child., May, 1929, xxxvii, 900.*—*(P. J. W.)*

Lipoids (Lipatren) in Tuberculosis of Children.—The main indication for the use of *Lipatren* lies in cases of surgical tuberculosis. Small doses are advised. Even fresh processes can be influenced without harm. Careful control is advised, using also the red-cell sedimentation reaction. Lipatren is not recommended for general use in pulmonary tuberculosis, but its cautious administration in stationary cases may be of value.—*Zur Dosierungsfrage der Lipoide (Lipatren) bei der kindlichen Tuberkulose, H. H. Knüsli, Zeitschr. f. Tuberk., 1928, l, 220.*—*(H. J. C.)*

Ultraviolet Radiation in Treatment of Tuberculosis in Childhood.—From 469 monthly examinations the authors conclude that a series of sedimentation rates has a definite value in judging the progress and prognosis of tuberculosis in children. Extrapulmonary cases were studied. As a diagnostic agent the sedimentation rate is limited, because a few cases of tuberculosis have a normal rate. An abnormal rate is an indication of disease, but not necessarily of tuberculosis. In many cases clinically and by sedimentation rate showing marked improvement, the blood-pressure rose in a correspondingly definite fashion. Carbo-

hydrate tolerance in patients suffering from tuberculous lesions is increased following exposure to ultraviolet radiation. Following the first month's treatment with ultraviolet radiation, many cases show a fall in sedimentation rate, followed by a rise in the succeeding month. In cases which are secondarily infected, or in which an abscess is developing, the succeeding rise is at least delayed. It is thought that the significance of the fall is an increased reaction in the focus of disease. Radiation is of considerable value in cases with central lesions (major joints, spine, hip, or knee), especially the earlier ones. Small doses are best. It is of less value in the cases which are moderately advanced but without sinus formation. Dosage must be properly graduated. It is disappointing in advanced cases with sinuses, possibly because of secondary pyogenic infection. In some of these, radiation did actual damage. The most favorable field for ultraviolet radiation is in the treatment of peripheral lesions (elbows and ankles, skin, peritoneum, cervical nodes.—*Study of Ultra-violet Radiation in the Treatment of Tuberculosis in Childhood, T. H. Martin and J. D. Craig, Arch. Dis. Child., February, 1929, iv, 47.*—(*P. J. W.*)

Splenic Extract in Pulmonary Tuberculosis in Children.—Armand-Delille was led to try this in his service, beginning about two years back, at the suggestion of a confrère. The extract was from pig's spleen. He began its use with much skepticism, and only in desperate cases which were unsuitable for pneumothorax or when the latter had not availed. To his surprise, he observed, in a large proportion, striking and unexpected amelioration. He is not unaware that these sometimes occur under ordinary sanatorium treatment, or even without treatment, but this series seemed so exceptional as to warrant serious consideration. The product used was a filtrate of macerated spleen pulp in glycerine, to which was added, after forty-eight hours in the ice-box, normal serum and the filtration repeated. Each week three hypodermic injections of 3 to 5 cc. were given. It is not thought that this medicament exerts a specific effect, but there certainly is a considerable general improvement interpreted as due to a stimulation of resistance. Armand-Delille has observed, in young adolescent girls as well as infants, febrile states accompanied by functional and physical signs and roentgenographic pictures which seemed destined to terminate fatally, improve and recover sufficiently to be regarded as cured. There is absolutely no local or general reaction or harmful effect to be feared. Several cases are reported, accompanied in one instance by comparative roentgenographs.—*Action favorable d'extraits splêniques sur certaines formes évolutives de la tuberculose pulmonaire chez l' enfant, P. F. Armand-Delille. Section d' études scientifiques de l'Oeuvre de la Tuberculose, February 11, 1928, reported in Rev. d. l. Tuberc., April, 1928, ix, 256.*—(*A. P.*)

Control of Tuberculosis in Cattle.—Autopsy reports, which showed an increase from year to year in tuberculosis among animals, led to the necessity of measures to control the disease. During one five-year period there were 34,000,000 retentions made (retention applies to condemnation of a part or whole of a carcass) for tuberculosis. Of this number 650,000 entire carcasses of cattle were condemned. Inspectors at the abbatoir do not know the veterinarians who identify the reacting cattle, but the record of the autopsy finally reaches the latter and the owner of the cattle. Notwithstanding the fact that lesions in the reactors are frequently small and hidden, autopsy reveals tuberculous tissue in such a high percentage of reactors as to justify the conclusion that the tuberculin test is a most reliable and dependable biological test which will eventually lead to complete eradication of tuberculosis in herds if followed by slaughter of the reacting cattle. There is no necessary relation between tuberculin reaction and size or situation of lesion. Other important questions remain unexplained as yet. But the fact (1) that, as now practised, the scheme for eradication is accomplishing extraordinarily good results and (2) that eradication of tuberculosis is actually being accomplished are matters for real gratification. They challenge the field force and inspection service to undertake mass testing on a national scale.—*The Practical Relation of Autopsy Findings to Field Work in Tuberculosis Control, J. H. Borger, J. Am. Vet. M. Ass., December, 1928, lxxiv (n.s. xxvii), 89.*—(*H. S. W.*)

So Called No-Lesion Reactors among Cattle.—"No lesion reactors" among cattle are important from the standpoint of inspection of herds and meat and of tuberculosis eradication. An unusual instance is reported of a young steer which became a reactor a few months after admission to a tuberculosis-free herd and was slaughtered. The carcass was examined with extraordinary care and no evidence of tuberculosis was found, although two mesenteric lymph nodes in the jejunal region were somewhat enlarged and reddened. The latter were without gross tubercle. A portion of these

was inoculated into guinea pigs and chickens and the remainder cut into sections. Neither animals nor fowl showed tuberculosis, but two of several scrapings from the cut-surface of the tissue contained acid-fast bacilli without lesions. Histological study revealed two minute tubercles, with tubercle bacilli which were very few in number and were found only after the greatest diligence and patience. More care should be exercised in the rather glib way in which the term *no-lesion reactor* is used.—*Studies on a Gross No-Lesion Tuberculin Reactor, H. E. Biester and C. Murray, J. Am. Vet. M. Ass., November, 1928, lxxiii (n.s. xxvi), 848.—(H. S. W.)*

Spontaneous Tuberculosis of Rabbits.—As an outspoken disease in rabbits, tuberculosis occurs very rarely. Few reports appear in the literature. The two cases reported here occurred at an interval of twenty-eight months and have no relationship whatever. The first case was found in a group of 11 rabbits inoculated intratesticularly with an emulsion of rabbit testicle infected with a laboratory strain of *Spirochaeta pallida*. Twelve days after inoculation the rabbits were castrated and five and a half months later necropsied. None revealed anything unusual except one, in which small, grayish-white nodules were observed in the serous layers of the thoracic and abdominal cavities. Many nodules were observed in the substance of the lungs. Similar lesions were produced in other rabbits when inoculated intratesticularly and intraperitoneally. Successful transmission was made in two more sets of rabbits. Grossly the lesion in the first rabbit did not resemble tuberculosis, but by continued passage through rabbits the lesions became more typical and more generalized. The microscopic appearance of the stained section of the first rabbit was atypical. The cells varied in size and stained poorly. There were no giant cells and no tendency to tubercle-formation. Several areas of necrosis were noted. Acid-fast bacilli were easily demonstrated in sections. The second case occurred in a rabbitry of approximately 80 animals. The animal had been apparently in good health to within a week of its death, when it was observed that the animal was not eating well and was losing weight. Necropsy revealed lesions only in the lungs, which were the seat of a confluent bronchopneumonia. Acid-fast bacilli were observed in smears and section. Intraperitoneal inoculation of its lung tissue produced typical tuberculosis. The microörganisms from the first rabbit were found to be of bovine type. The source of infection could not be traced.

Summary: Two cases of spontaneous tuberculosis in rabbits, which is rare, are described. In one rabbit atypical nodules on the serous membranes of thoracic and abdominal cavities, together with an unusual cellular response, suggested an endothelioma type of neoplasm.—*Spontaneous Tuberculosis of Rabbits, M. J. Harkins and E. R. Saleeby, J. Infect. Dis., December, 1928, 43, 554.—(F. G. P.)*

Spontaneous Tuberculosis in Snakes.—Spontaneous tuberculosis in snakes was first described by Selby as occurring in a ring adder (*Tropedorotus natrix*). Since then other authors have reported a number of cases of tuberculosis in snakes. Some of these attributed the infection to the feeding of tuberculous birds. The present report deals with a study of the occurrence of spontaneous tuberculosis in four garter snakes (*Thomnopis sirtalis*) which died at the Philadelphia Zoological Gardens. At necropsy the livers of these snakes were found to be dark red, firm, and studded throughout with hard, grayish-white, slightly elevated tubercles. In three of the snakes the right lung showed numerous gray, firm, elevated areas of consolidation. Along the trachea there was a chain of grayish-white lymph nodes. In the last two snakes examined the spleen was enlarged, of uniform grayish color, and softer than the normal spleen. In one of the snakes there was a cavity in the liver, measuring 1.5 x 3 cm., and about 5 mm. deep. The cavity was filled with a grayish mucopurulent material which showed a large number of acid-fast bacilli. Throughout the lungs there were sharply defined, more or less rounded lesions, consisting of a diffuse-staining necrotic centre surrounded by layers of large cells with a round, clear, vesicular, pale-staining nucleus. A narrow layer of dense connective-tissue cells separated the lesions from adjacent tubercles and from the surrounding tissue. There were numerous smaller deeply-staining cells outside the connective tissue, and numerous large cells with coarse eosinophilic granules were scattered throughout. In some areas the lesions had become confluent. Within the alveoli numerous desquamated cells and cells with eosinophilic granules were noted. Similar lesions were observed in the liver and spleen. Those in the spleen were more necrotic. A small number of extracellular, beaded, acid-fast bacilli were scattered throughout the tubercles. No calcification or giant cells were noted. From the lungs of two of the snakes and the livers of three a pure culture of an acid-fast bacillus was obtained. Colonies appeared within nine days on Dorset's

medium that had been inoculated with the lung and liver of the first snake. From the various organs of the second and third snakes, colonies appeared within eighteen to twenty-one days, but no culture was obtained from the fourth snake. Petroff's medium and glycerol-agar, inoculated with the neutralized sediment, remained sterile when kept at 25°C. or 37°C.; similarly, no growth was obtained on Dorset's medium kept at 37°C. Transplants of the primary cultures on Dorset's or Petroff's medium or glycerol-agar or in broth showed luxuriant growth within from five to six days when kept at 25°C. but no growth at 37°C. A luxuriant growth was obtained on glycerol-agar ranging in reactions from pH 6.6 to 7.8. Nitrates were reduced to nitrites by one strain but not by the others. When glycerol-broth with an initial reaction of pH 6.8 was used as a medium, its reaction gradually changed to pH 7.4 after two weeks and remained at that point until the fifth week; then it gradually became more acid and by the tenth week had fallen to a pH of 6.8. The peach- or salmon-colored chromogenic substance does not differ throughout the medium. It is slightly soluble in xylol but not in various other solvents. In smears from organs stained with carbol-fuchsin and decolorized by Gabbet's method the microörganisms appear as slightly curved, slender bacilli, ranging from 4 to 7 micra in length and about 0.5 micron thick. Numerous beaded and barred forms were noted, as well as short, thick, solid-straining forms. In smears from cultures the microörganisms were 4 to 8 micra in length, slender, slightly curved, and frequently showing parallel arrangement. Beaded and barred forms were common and there were numerous bacilli with deeply-stained polar granules. The microörganism is not discolored when exposed to 25 per cent sulphuric acid for 10 minutes. Many of them are, however, discolored by a 3-minute exposure to 3 per cent hydrochloric acid, 5 per cent nitric acid, or 10 per cent sodium sulphite, and are completely discolored when exposed for 3 minutes or longer to 95 per cent alcohol. With Loeffler's methylene-blue the body assumed a faint blue color and the polar granules a deep blue. The bacilli stain readily with gram's method and retain the original stain. The microörganism is pathogenic for garter snakes, frogs, goldfish, chameleons and lizards, but not for guinea pigs, rabbits, chickens or pigeons. Antisera were prepared against different strains by repeatedly injecting increasing amounts of the different living cultures into the general circulation of rabbits. By means of the agglutination reaction it was found that the cultures isolated from the various snakes were antigenically the same and that they differed from the acid-fast bacilli isolated from other cold-blooded animals. Concentrated tuberculin was prepared from cultures on glycerol-broth and on the synthetic medium of Proskauer and Beck. The injection of 0.01 or 0.1 cc. of this concentrated material into the dermis of guinea pigs, previously infected with the different strains of the culture isolated from the snake or into the dermis of guinea pigs infected with the human or bovine type of tubercle bacillus invariably gave a negative reaction. Guinea pigs infected with the different strains isolated from the snakes gave a negative reaction when injected in the dermis with Old Tuberculin. *Summary:* Tubercles were found in the various organs of four garter snakes (*Thomnophis sirtalis*) found dead in the Philadelphia Zoological Garden. Large numbers of acid-fast but not alcohol-fast bacilli were observed within them. The tubercles consisted of a central area of necrosis surrounded by cells with a large, clear, vesicular nucleus, by connected tissue, and by some deeply staining smaller cells, with numerous eosinophiles scattered throughout. From the various lesions was isolated an acid-fast but not alcohol-fast chromogenic bacillus that grows best at from 20°C. to 25°C. and is pathogenic for garter snakes, frogs, goldfish, chameleons and lizards, but not for guinea pigs, rabbits, chickens or pigeons. The bacillus differs in cultural and antigenic characters and in staining reactions from previously described pathogenic and poikilothermic acid-fast bacilli. The name *Mycobacterium thamnopheis* is suggested for this organism.—*Spontaneous Tuberculosis in Snakes, J. D. Aronson, J. Infect. Dis., March, 1929, 44, 215.*—(*F. G. P.*)

Pulmonary Tuberculosis.—This essay opens with the statement that the author agrees essentially with Ranke's concept of tuberculosis. But while Ranke claimed that chronic pulmonary phthisis is usually the result of haematogenous metastasis from the lymph-node focus of the primary complex, Aschoff is inclined to believe that aerogenous, exogenous superinfection is the more common occurrence. Although this question is of great importance from the standpoint of prophylaxis, it cannot be discussed in this paper, especially since the pathologist can not, by his methods, contribute to its answer. The present discussion is concerned with this question: *Where are pulmonary reinfections most frequently localized, and how does progressive phthisis of adults develop from these reinfections?* It is generally admitted that phthisis in adults usually develops from reinfections and not from

primary foci. By reinfection is meant every infection coming from outside of the lung; that is, every extrapulmogenic tuberculous reinfection of the pulmonary tissue. It does not matter whether the new infection is derived from a bronchoglandular focus, from a tuberculous focus in some other organ, or from an aerogenous superinfection. A tuberculous focus may be designated as reinfection, only when an older, healed pulmonary focus is present which is not likely to have caused a bronchogenic spread. This is usually the primary focus, whose anatomical characteristics are fairly well established. If the primary pulmonary focus is not demonstrable, it is usually possible to demonstrate the lymph-node component. Puhl has described characteristic cicatrizations (Puhl foci) which are generally recognized as foci of reinfection. They are, however, not the sole manifestation of reinfections. Focke has shown that the small subpleural scars and the cartilaginous thickenings, which are frequently seen in the apical region, are residua of tuberculous reinfections. Macroscopically they do not show chalk or lime salts, but in careful microscopic studies they are found to contain central necrotic masses in indurated pulmonary tissue. Every cartilaginous scar (Schwiele) is considered to be of tuberculous nature. Anders was able to demonstrate that the hardened pleural lymph-nodes, which appear frequently as small black foci, are tuberculous residua. They are usually foci of reinfection, but they may be part of the primary infection. It may be stated that all definitely circumscribed thickenings of pulmonary and pleural tissue are tuberculous in origin, regardless of the absence of caseous, chalky, calcified, or ossified masses. The only exception to this rule is represented by pneumonokoniotic lesions. More than 90 per cent of all adults show at necropsy not only a primary complex, but evidence of phthisical reinfections as well. Most of the primary foci develop in childhood; but late primary foci are observed in some instances; they show the same characteristics as those in childhood. Primary foci may occur in the apical region; they should not, on account of their localization, be mistaken for reinfection foci. At what age do reinfections occur? According to clinicians, repeated secondary propagations are not rare in childhood. They usually disappear readily; but in the cranial parts they are supposed to last longer and frequently develop into the characteristic apical scars. Aschoff has not seen in his material fresh or healed reinfections localized in the apices of children. Nevertheless, they may occur; but they are certainly rare. Generally, reinfections resulting in scars occur only after childhood, and their frequency increases with age. The question arises whether reinfections from different age periods show structural differences. It has been claimed by clinicians that particularly during puberty and for some years later reinfections occur; interpreted as aerogenous superinfections, which are characterized by a marked collateral inflammation. These foci of chiefly subclavicular localization are supposed to be the incipient stage of progressive phthisis. According to pathological studies, *all* reinfections start this way; they all begin with an exudative phase which is quickly followed, in the center of the focus, by more productive, acinous form of tissue reaction, with typical epithelioid cells and with caseation. In the meantime the exudative reaction of the periphery may increase in size. In other words, all reinfections begin as "early infiltrations" (Frühinfiltrat). These foci have a marked tendency towards cicatrization; the vast majority heal and result in scars such as mentioned above. Pathologists have always claimed that the majority of these scars are found in the apical parts; this statement is confirmed by roentgenologists. The term "apex" is misleading because anatomists, pathologists, and roentgenologists use the identical term to denote different things. The localization of a pulmonary focus should be described in terms of the bronchus supplying the area. Isolated reinfection foci are found exclusively in the area of the apical and subapical bronchi, which supply in part (roentgenologically) infraclavicular regions. There is but little doubt that foci in the lower region of the subapical bronchus are at times bronchogenic metastases from strictly apical, subpleural foci. The majority of all reinfections occur in the region of the apical bronchus; but reinfections may occur in the region of the subapical bronchus or of deeper bronchi, in the presence or in the absence of foci in the area of the apical bronchus. Apical, subpleural scars facilitate the lodging of larger foci in the subapical parts. Each reinfection focus increases the chances for lower localizations of new infections. It is significant that the lower foci are likely to enlarge; this may be due to the fact that they are caused, according to Loeschcke, by aspiration of coarse infected material. Although subapical foci do occur independently of and without subpleural apical lesions, it would be wrong to assume (as it is done in recent clinical studies) that only they are the source of progressive phthisis, and that they are genetically different from the apical lesions. All reinfection foci are pathogenetically alike; their different localization does not make any essential

difference in their significance. How does progressive phthisis develop from such reinfections? By "progressive phthisis" is meant every intrapulmonary progression of a tuberculous process by bronchogenic propagations, originating from a reinfection focus. It will be necessary to decide the question whether certain reinfection foci are particularly apt to lead to a progressive phthisis. It has been pointed out in a previous paper that the localization of the focus is not a decisive factor, nor does the size of the focus play a significant rôle; but an increasing focus may break into a larger bronchus. Since the lower, that is, the subclavicular foci are more likely to be larger, it is obvious that they involve the greater danger of greater proximity to larger bronchi. The decisive factor for the development of progressive phthisis is the softening of the caseous centre and its emptying into the bronchial tree. The smallest cavity is the incipiency of progressive phthisis. The so called "new teaching" claims that progressive phthisis starts always with an *acute* softening of a fresh reinfection focus. This condition is likely to lead to acutely and rapidly fatal disease, but the term "phthisis" embraces, too, the slowly progressing processes. The latter originate by a secondary softening of a retrogressing focus. Apparently latent, well-encapsulated lesions may exacerbate, break the capsule, and thus start progressive phthisis under the roentgenological appearance of an "early infiltration." *Conclusions:* All isolated reinfections begin with exudative-productive processes ("early infiltration"). Most of the collateral exudate is usually resorbed; the rest of the focus is transformed into a scar. The vast majority of all reinfections heal. All circumscribed indurations of pulmonary and pleural tissue are phthisical scars, with the exception of pneumonokoniotic lesions. The frequency of such reinfections in adults is as great as that of primary foci. A differentiation of reinfections, pathogenetically and prognostically, into childhood and adult reinfections, is pathologico-histologically impossible. Before the age of puberty reinfection scars are rare. Most of the reinfection foci are in the respiratory region of the apical bronchus; but some are found in the region of the subapical bronchus or even deeper. Their size increases from apex toward base. Multiple foci may have independent origins. Progressive phthisis may originate from any reinfection focus, regardless of localization or size. Important is the relation of the focus to the bronchi, and its varying tendency to soften. The danger of bronchial proximity and of liquefaction is greater the further the focus is removed from the apex. Haematogenous and aerogenous reinfection foci cannot be differentiated. Liquefaction may occur in a fresh reinfection focus or in an old, encapsulated one; in either case it may produce the roentgenologic picture of an "early infiltration."—*Über den phthisischen Reinfekt der Lungen, L. Aschoff, Klin. Wchnschr., January 1, 1929, i, 1.*—(*M. P.*)

Pathological Anatomy of Pulmonary Tuberculosis.—Roentgenological methods make it possible to study pathological anatomy in the living patient, to observe the chronological development, and to correlate the findings with the symptomatology. Autopsy findings, however, excel in the certainty of the quantitative, qualitative and topographical diagnoses. Both methods of study have the same aim; namely, to establish the morphological pathogenesis of the disease and to correlate the latter with the clinical signs and symptoms. Recent clinical studies resulted in what has been represented as "new" concepts; their fundamental points are briefly as follows: "Genuine" pulmonary phthisis starts, as a rule, with processes below the apices. An infraclavicular focus is the first anatomical manifestation; the involvement of the apices occurs later. This first manifestation is frequently associated with grippe-like symptoms. In analyzing the literature on this subject from the viewpoint of pathological anatomy, it must be stated that a so called "genuinely phthisical focus" cannot by any morphological criteria be distinguished from a "merely tuberculous" or "prephthisical" focus. The question then should be formulated: "What is the location of the first focus of pulmonary tuberculosis which develops in the thorax of an adult—regardless of the primary complex?" This question must be decided on lungs which contain, besides the primary complex, a tuberculous lesion. The available material may be grouped into three classes, namely, cases in which pulmonary tuberculosis caused death, cases in which progressive pulmonary tuberculosis of limited extent is found but in which death was caused by some other disease, and cases in which only scars of tuberculous foci are demonstrable. In the first group of cases it is hardly possible to determine the site of the first focus, while cases of the third group, with only *one* lesion, leave no doubt as to the topography of the first focus. In this type of case, apical localization is the rule; it is always the area of the apical bronchus which is involved. These foci can, therefore, not be identical with the infraclavicular infiltrations which have been described as first anatomical manifestations. Apical

scars are sometimes found in children; they are, however, much more frequent in adults; it must be concluded that the majority of them develop during adult life. The presence of infraclavicular lesions in the absence of roentgenologically demonstrable foci, is explained by the impossibility of the roentgenological demonstration of small apical foci. Infraclavicular foci are undoubtedly preceded by apical lesions; the former may develop by aspiration from the latter, or their pathogenesis may be completely independent. The author believes that all the various possibilities are materialized in different cases: aspiration from the apical focus, reactivation of the apical focus after a period of latency, a spread to lower parts, exogenous reinfection, haemotogenous reinfection. Considering the frequency of anatomically demonstrable apical lesions, it is obvious that the majority of them does not cause any clinical symptoms. Similarly it follows that the prognosis of "anatomical apical tuberculosis" is benign as regards spread and mortality. A clinically active apical focus must be considered as a potential danger and must be treated as such. *Conclusion:* The by far most frequent form of pulmonary tuberculosis in the adult is apical tuberculosis; on account of the scarcity of symptoms which it causes, it is rarely observed clinically. The prognostic significance of the anatomical alterations in apical tuberculosis is small; its diagnostic and differential diagnostic significance remains, notwithstanding the so called "new concepts," fundamentally important.—*Über die neueren Anschauungen pathologischen Anatomie der "Lungenschwindsucht" des Erwachsenen, S. Gräff, Klin. Wchnschr., December 16, 1928, li, 2428.*—(*M. P.*)

Anatomy of Primary Focus in Lung.—Blumenberg has been quoted by Aschoff as having made the statement that essential differences exist between the histological structure of the primary focus in children and in that of adults. Blumenberg points out that he has never made such a statement, but that he fully agrees with Aschoff that the primary focus is characteristic in its histological structure regardless of the age at which it develops. He has described a fresh primary focus in a man 71 years of age, and this lesion presented the same structural characteristics as those described by Ghon in children. It was shown, however, that the alleged immunological influence of a childhood infection upon the course of a phthisis in adult life does not exist, since the residua of childhood infection are absent in a number of otherwise typical cases.—*Grundsätzliches über die anatomische Beschaffenheit des Lungenprimäraffectes, W. Blumenberg, Klin. Wchnschr., March 12, 1929, viii, 505.*—(*M. P.*)

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